

Train engineers over seven years—Tories

by Robin McKie
Science Correspondent

Engineering students should receive a total of seven years' training, including five years on an academic course that would incorporate increased industrial practice. This is the Tory plan, revealed this week by Dr Keith Hampton, a Conservative higher education spokesman, and which is intended to regenerate British education's input into industry.

The proposal is part of a report, *The engineering profession—a national investment*, prepared by a study group, which included industrialists and educationists, chaired by Professor John Thornton, dean of engineering at Newcastle University.

Introducing the report, Dr Hampton said Britain's engineers were in danger of being the worst trained in the world, and might even be putting lives at risk. "This investigation shows that not only have standards to be raised but the whole nature of the training should be changed. We have simply got to attract to engineering more first-rate sixth formers."

The report proposes that integrated engineering courses be set up in which academic learning and post-graduate training are continuous processes. Five-year courses should be set up on the sandwich

principle and on completion students should have to undergo a further supervised period of two years' professional practice.

This "five plus two package" would be regarded as the minimum requirement for chartered engineer training, Dr Hampton added.

The report states that the group was unhappy about the uneven standard of entry into chartered status and it urges the professional institutions to be more vigorous in their monitoring of courses and training.

There should be new conversion courses which would help technicians engineers improve their status and qualifications, and there should be special grants to enable them to take the courses.

The report also calls for the creation of two new bodies:

- An engineering training board which would highlight places able to provide the best post-graduate training.
- A society for engineering education which would promote the wider involvement of employers and trade unions in the education of engineers and raise the stature of engineering in schools.

A two-tier structure for the profession, with chartered and technician engineer levels, is urged and a non-departmental cabinet minister for engineering is also suggested in the report.



Employers 'shun the DipHE'

by John O'Leary

Few employers recognize the value of a Diploma in Higher Education, a random survey of those who traditionally recruit graduates has revealed. It is clear from the small sample taken that many have still not heard of the qualification, while some others have taken a positive decision not to employ diplomates.

The survey was carried out by Mr Brian Glover, who is engaged in research into all aspects of the DipHE, by means of a questionnaire sent to 50 organizations advertising for graduates last year. Less than half replied and only four said they would be willing to employ diplomates.

Mr Glover said the sample was a small one on which to base general inferences, but conceded that it was reasonable to assume that the non-respondents were less likely to have given any consideration to the DipHE. "There is some indication that the purpose of the DipHE—to provide a varied pattern of personal education for two years after A Level—is either not understood or not accepted," he said.

As yet, only 123 students have completed a DipHE course and left formal education. Since the destination of most of this group is unknown, it is impossible to determine the actual value of the qualification in employment terms.

Figures collected by AC10, the Association of Colleges Implementing DipHE Programmes, show a rise in the total intake of students last year from 955 in 1976 to 1,182. Many of these, however, are registered on DipHE courses with the expressed intention of taking a three or four-year degree course. More than half of the 1977 entrants were mature students and a third of these were admitted with less than two A levels, although only 5 per cent of those under 21 were admitted with similar qualifications.

Mr Eric Robinson, principal of Bradford College, writing in the *DipHE* journal, said the future of the DipHE remained in the balance. This was the responsibility of the Department of Education and Science, he said, which had behaved irresponsibly since launching the diploma. College closures had been carried out with apparent indifference to the DipHE.

Mr Robinson accused most of those responsible for drawing up guidelines for the DipHE of reneging on the agreed document and called for the reconvening of the working party for the Minister of State Higher Education, Mr Gordon Oakes, to "deliver a lecture about honour and integrity."

The five northern universities are singled out for attack for "taking the cowardly shelter of their joint matriculation board" in refusing to allow DipHE holders exemption from matriculation requirements.

TUC boycott of crucial Fircroft talks

by Maggie Richards

A crucial meeting of international bodies involved in the attempt to rescue Fircroft Adult Education College at Brentford has been called off this week after the major participants, the Education Union Congress, opted out of the discussion.

The TUC action raises questions about the future of Fircroft, which is now scheduled for September, 1979, but set for the beginning of the academic year.

Fircroft was closed this week following student unrest, and a Government spokesman has recommended the dismissal of the principal and four tutors.

The college's relaunch has been postponed earlier this year, but the intervention of the Charity Commissioners, who objected to TUC's proposed 51 per cent share in the new governing body, has prevented the meeting from going ahead.

This week's meeting was intended to be a discussion between the Charity Commissioners, the Department of Education and Science, TUC representatives and the college trustees, in a bid to overcome the stumbling block of the trustees' view that the college had no future.

TUC officials viewed it as an opportunity to put forward a case for the 51 per cent share, but it was then learnt that representatives of the Old Fircroft Guild—former students of Fircroft—had been invited to the meeting. The Guild had previously opposed the structure of the new governing body.

A spokesman for the Guild explained: "It was a difficult decision for us to make, but we felt that the Guild must be involved in the future of the college. The meeting was not to be used as a platform for the Guild to put forward its own proposals."

The Charity Commissioners have a perfect right to talk to anyone involved, and we would not feel that we had been excluded from the meeting. There would be no point in attending a meeting where the outcome of our argument was to be decided by other people."

One other reason for the reluctance to attend the meeting has been suggested. It is believed that trustees are now expressing doubts about the wisdom of pursuing the 51 per cent majority policy for the college.

The TUC spokeswoman was prepared to comment, and said that Christopher Canbury, head of Fircroft Trust, could not be contacted for his reaction to this situation.

An alternative proposal for a 51 per cent trade union representation on the governing body has been put forward by the Education Union Congress.

A spokesman for the OGC said that the Guild had not been invited to the meeting, but that the Guild had not applied to the Charity Commissioners to be represented at the meeting.

Race law threat to rebel council

by Judith Judd

Hampton County Council has been told by the Government that it risks prosecution under the Race Relations Act if it refuses to cut the number of overseas students.

The council's present policy is to admit overseas students as long as they are not taking places which could be filled by home students.

In colleges have 1,700 overseas students and these would have to be cut by between 450 and 500 by 1980 if it carried out the Government's instruction to reduce their numbers to 1975-76 levels. The council says this would threaten some college courses with extinction.

Last year the Secretary of State for Education made special arrangements for colleges limiting numbers of overseas students to be exempt from the Race Relations Act.

However, the Department of Education and Science has written to the council to say that its policy may still render it liable to prosecution under the Act and that it will not be protected by the special arrangements unless it obeys the Government's instruction.

This week the council's further education sub-committee asked the governors of all the county's colleges to consider and report on the impact of the DES request to introduce a phased reduction of overseas students by 1 per cent by 1980/81. It will decide whether to change its policy when it receives their reports. Many councillors still feel that the Government plans for reducing numbers are unreasonable.

The University Grants Committee has told all universities that overseas students should not be admitted at the expense of home students.

A spokesman for the DES said that the Government had less power to interfere in the universities, which are autonomous bodies, than in local authorities and public sector colleges.

The Government is still trying to sort out the implications of its new legislation.

Mr Judd said a letter to all vice-chancellors saying that the Government would have to be changed to comply with the law. Universities might be liable to the charge that they were discriminating against home students.

UGC applies 'steerage' to take system back on course

by Ngaio Creguer

The University Grants Committee has decided to apply some badly needed "steerage" to get the university system back on course in its sharing out among individual institutions of the provisional grant for the next three years.

Mrs Williams, the Secretary of State for Education and Science, announced details of these individual allocations in the House of Commons on Tuesday. Vice-chancellors have also been sent detailed letters by the UGC telling them what grant their university can expect in the three years from 1979-80 to 1981-82, and an agreed target for students numbers at the end of that period.

The UGC hopes that this new "triennialism" will provide universities with a more distant planning horizon after the three years of year-on-year grants which has been the rule since the collapse of the old quinquennial system. As confidence revives, the committee hopes, universities will reduce their balances, now running at the high figure of £600 million by the end of 1980.

However, they do not want to encourage over-expansion—particularly towards the end of the three-year period. Universities have been warned that their grant will not be increased if they overstretch their target for student numbers. The message is very much "steady as we go."

Mrs Williams said that the provisional grant allocation for the next three years, after deductions for full-time fees, would be £635 million in 1979-80, £648 million in 1980-81, and £670 million in 1981-82. The allocations were based on 1981-82 student totals of 310,000.

The UGC has changed the method by which the allocation is calculated. It feels it can estimate with reasonable certainty the national total income of student tuition fees. The provisional figure being given to universities is the grant plus an estimated income for tuition fees of full-time students, including those on sandwich courses but excluding part-timers.

This will be converted into a realistic grant allocation by deducting the income from tuition fees once they can more accurately be expressed. It will mean that universities will not, as at present, be able to pursue proposals with a view to increasing their student intake. The increase in tuition fees income would not be matched by an increase in the UGC grant.

The change will give the UGC a tighter hold on university expansion but may make individual university budgeting a much more fraught exercise.

The UGC is also clear about the academic direction it thinks institutions should take. Universities should maintain or slightly increase the numbers of postgraduates in arts subjects, which are at "an undeniably low level."

The introduction of degree courses, or appointment of staff for



Ralf Dahrendorf discusses, and deplores, the growth of a new "educational class" in his last column for The THES, 26

Is the grass greener?

Ngaio Creguer compares the lifestyles of a university lecturer at Aston and a polytechnic lecturer at Oxford, 8

The real salary anomaly Leader, 27

Keir Hardie

A. E. Musson reviews a new biography of "the most saintly figure in Labour's hagiography," 12

Bridge of Sighs

Nigel Saul recalls Hertford College's struggle to build a bridge over New College Lane, 9

Sir Sam Edwards

Robin McKie interviews the Cambridge physicist and former SRC chairman, 7

Popper or Bacon?

L. Jonathan Cohen discusses the excessive influence of Sir Karl Popper over the philosophy of science, 11

North American news

Overseas news 5
Books 12-16
Noticeboard 17
Classified index 18
Don's Diary 26
Letters 27

ILEA should stay says Marshall report

by Lisa Wood

No fundamental changes in arrangements for further or higher education in London have been recommended in the Marshall inquiry on Greater London which was published this week.

Within a 12-page section on education Sir Frank Marshall said that some of those who took the line that the Inner London Education Authority should be abolished argued that further and higher education should be hired off and made a Greater London Council responsibility.

He said: "This would, of course, cut across the philosophy of the 1944 Education Act that education should be regarded as a 'seamless garment'."

Sir Frank said that while a GLC (Metropolitan) approach had great attractions he felt it advantageous, at a time when there was a change in the balance of forecast demands for secondary, further and higher education, that the further and higher education sector in London should be left as it stood. This would give local education authorities the maximum scope to develop their policies for 16 to 19-year-olds.

But he said there was scope for I.E.A.s throughout London and the South East to improve arrangements to cut overlap in the use of resources.

A cautious approach towards education was also taken this week in a Labour party document, *Local Government Reform in England*. This will be presented to the party's annual conference this year.

The document describes a need for large scale re-organization but because of the disruption involved it recommends limited local government changes including those in education.

It argues for a case by case approach to the possibility of transferring responsibility for education to the urban largest districts, with populations of 200,000 and over. This would include cities such as Bristol, Hull, Leicester, Nottingham, Derby, Stoke, Southampton and Plymouth. But it says: "It is particularly important that further education services in these cities should remain open to students in the rest of the country area."

Government backs OU course for school governors

The Open University is to receive a government grant of £90,000 to develop a correspondence course linked to television and radio programmes for school governors and managers.

Mrs Williams, Secretary of State for Education and Science, has welcomed the move as a follow-up to the report of the Taylor Committee last year, which suggested greater participation in school affairs by parents and teachers.

The grant, from the Department of Education and Science, will be used over the next three years to compile the course and to carry out a research project on its effectiveness.

It is envisaged that the course will consist of correspondence texts linked to radio and television broadcasts. It will require about six hours of study per week, and will be spread over an eight week period. The cost of the course is expected to be about £6, and it is scheduled to be presented for the first time in 1980.

The OU team producing the course will be under the direction of Professor Ron Glaser, professor of educational administration in the university's faculty of educational studies. The team's chairman will be Mr Roy McHugh, senior

research fellow in the faculty, and himself a school governor.

It is planned to involve representatives of local education authorities, head teachers, teaching staff, parents and existing governors and managers in discussions about the compilation of the course.

The university is also hoping that Leas will use the course to supplement their own training for governors and managers.

Welcoming the proposed course, Mrs Williams said: "Although there has been controversy about some of the Taylor Committee's recommendations, there has been widespread support for the basic idea that parents and teachers should have a right to elected membership of governing bodies, and I have made clear my intention to introduce legislation to give effect to this."

"I am sure that a course of this nature, developed with help and advice from those with relevant experience in the field, will be of value not only to new governors, but to many existing ones as well."

Lord Taylor, chairman of the committee which produced the report on school governors and managers last year, will be interviewed in an OU radio programme to be broadcast at 6.05 pm on July 27 on Radio 3 VHF.

Union action will halt BEC courses

by Patricia Santinelli

A dispute between the National Association of Teachers in Further and Higher Education and Surrey County Council will prevent the start of Business Education Council courses this September, in four colleges.

NATFHE had asked for extra cash or remission time for more than 60 lecturers involved in preparing the courses but the authority refused, instructing the colleges to find the resources out of their own budgets.

Now NATFHE has instructed the lecturers at Brooklands, North East Surrey, Guildford and Redhill colleges not to prepare for BEC courses at levels I, II and III for starts in 1978 and not to start courses at levels II and III until 1979.

Mr M. Watts, the authority's further education officer, said it was impossible to provide these extra resources until next year's budget is fixed.

Mr Watts claimed that NATFHE had selected Surrey for this type of official action. "Staff in colleges working on BEC courses were proceeding normally for preparation and for a start in 1978 until they received instructions from NATFHE," he said.

But Mr Stan Broadbridge, general secretary of NATFHE denies this was ever intended. "Action was taken because a deadlock had been reached between NATFHE members and the authority," he said.

"It is in line with our general policy on BEC courses, which is to see that extra resources are being made available to lecturers for preparation. The authority has already

agreed with BEC that this would be necessary."

However, he is hopeful that a meeting in two weeks between the authority and NATFHE representatives will resolve the problem and that some form of agreement will be reached. He thought anything less than £1,000 per college would be reasonable—or remission time for staff.

"If nothing is resolved at this meeting, it will mean a serious dispute with the authority which is bound to escalate. I cannot say now what action will be taken but it might be far more stringent than present measures," he said.

Another deadlock has already been reached with Oxfordshire County Council which a NATFHE delegation is to visit shortly. There are colleges are involved in similar action with the authority determinedly refusing extra resources.

Pay scale talks

Talks were expected to take place last week between the Association of University Teachers and the Education Union Congress about how to apply the new pay scales.

It has already been agreed that the pay anomaly should be resolved in two stages. At last week's meeting the intention was to discuss detailed application of the agreement.

NEXT WEEK

Oxford's "Bridge of Sighs" Should our Scientists be Bored? Peer review and the Boredom Interview with Sir Sam Edwards Hardie.

Can jogging damage your health?

by Robin McKie
Science Correspondent

As we use wallowing in sanctimoniousness as you return beet-faced and panting from a heavy morning jog round the neighbourhood for the keep-fit value of this increasingly popular sport is still very much in question.

Certainly, if it wasn't in doubt, the Sports Council wouldn't be spending £125,000 on research into jogging's long-term merits and demerits at Loughborough University wouldn't be wasting their research programme, backed by a council, which will investigate the

development of the skills and physique of athletes, their conditioning and coaching techniques and the health benefits of various sports—including jogging.

As Professor Harry Thomason, head of the university's department of physical education and sports science, said: "Jogging might make you feel better, but it may be just a short-term feeling."

"The sport comes from America where it has been assumed that it has benefits like prolonging your life, but no one really knows."

"Jogging may or may not have long-term benefits and we shall be investigating that aspect."

So you may as well wallow in bed and get lazy and fat while you wait for the results.



Advisory panel for Japanese studies

A small advisory panel headed by Sir Frederick Dainton, chairman of the University Grants Committee, is to advise the Japanese ambassador on how best to promote Japanese studies at British universities.

The panel is currently drawing up a list of proposed projects which could be carried out to stimulate interest in Japanese politics, economics history and language. It will then be presented to the Japanese ambassador, Mr Tadashi Kato, who will hope to get financial backing for the work, mainly from private companies in his own country.

The move stems from an Anglo-Japanese commission held in London at the beginning of the year when the sole topic on the agenda was how to promote more interest in Japanese studies.

Oxbridge holds less sway for career in management

by Robin McKie,
Science Correspondent

Academic qualifications are becoming increasingly important for British managers, particularly for those with specialist technical, scientific or management degrees. A survey published this week, also reveals that a privileged educational background is far less vital to a career than in the past.

"People from elitist social and educational backgrounds are, of course, represented in management, and well represented," says the survey. "But if we look at management at all levels and on a national scale, a much less biased picture emerges."

The survey indicates that only at the top level of company directors does a public school—Oxbridge education still have importance. "As one progresses down through the managerial levels and age groups the public school—Oxbridge background becomes far less evident, while the general standard of edu-

cation and qualifications increases." The Institute says that one indication of this trend is the increasing number of specialists and technicians finding their way into management, while the number of generalists is decreasing. In 1976, arts graduates formed 27 per cent of managers; in 1982, it was down to 9 per cent; and by 1976, the figure had reached 6 per cent.

The survey shows also that many of the present undergraduates have favourable attitudes to careers in industry—42 per cent of arts students and 60 per cent of scientists said they were considering such a move.

"One is forced to conclude that today's managers are both better and more relevantly qualified than those of the past," says the survey. "It is time perhaps for another comparative study of British managers together with their European and American counterparts, since reliance on earlier evidence may be unjustified."



Professor Gordon Cherry, professor of urban and regional planning at Birmingham University, was elected president of the Royal Town Planning Institute by the Institute Council yesterday.

Appeal for 'corporate status' polys

by John O'Leary

The Conservatives this week promised an inquiry into teacher training if they won the next election. Mr Norman St John-Stevens, party chief education spokesman, said the content of courses would be reviewed to see that the schools' needs were more adequately met.

He outlined the changes he would like introduced, giving top priority to an increase in practical training over educational theory in both undergraduate and postgraduate initial training courses. Theory would be largely reserved for in-service courses.

"Too much theory at the initial stages may hinder development of practical skills and confuse the student, who will not yet be able to relate it to the realities of the classroom," Mr St John-Stevens told a National Union of Teachers conference in Gwent.

One-year postgraduate certificate courses will provide the training for more than half of all new teachers by 1981, should devote at least a term to teaching practice. He said many now contain too much theory in a mistaken attempt to gain academic prestige. When not in the classroom, students should concentrate on teaching skills, how to keep good discipline, organization of work and assessment of pupils.

The proposed shift of emphasis towards the schools would provide a good opportunity for the involvement of teachers as on-the-spot tutors for initial and in-service training. The use of "teacher tutor" status would have the dual effect of improving training and showing the value of teachers' experience.

In their submission to Mrs Williams, Secretary of State for Education, the Standing Conference of Principals and Directors of Colleges and Institutes in Higher Education also drew attention to the difficulty of satisfying proposed minimum teacher training entry requirements by 1980.

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ILEA puts £1m into post school plan

by Patricia Santinelli

Major proposals for extra 16 to 19 post-school provision costing nearly £500,000 were approved by the Inner London Education Authority this week.

As a result colleges, the careers and youth service and the adult education sector are to be provided with extra staff and equipment at a cost of £205,400 in the current financial year and £482,300 in a full year.

Colleges are to receive nearly £300,000 in a full year to support extra teaching and non-teaching staff as well as purchase technical equipment to meet the needs of courses for 16 to 19-year-olds.

This will provide for an equivalent of 16 full-time teaching posts and the appointment of 30 support staff. Their main role will be to develop day release courses related to the Manpower Services Commission work experience schemes and City and Guilds Foundation courses including linked courses with schools. It will also allow

for the continued expansion and further development of courses for 16 to 19-year-olds.

In addition, it is planned to use the funds for replacing teachers seconded to the MSC research team and to allow a larger programme of vocational preparation courses and those for unemployed school leavers. An extra £24,000 is to be spent on additional advisory teachers to work with the Youth Opportunity Programme and with the further and higher education inspectorate.

Another major allocation amounting to £124,000 in a full year has been made to the youth service and the adult education sector. This will allow the appointment of an additional four youth officers and support staff to be allocated to the most needy areas.

Second, it will enable the creation of a pool of resources which adult education institutes and youth centres can use in the highest areas of unemployment to initiate or expand their provision for 16 to 19-year-olds.

The careers service is to receive £52,000 to cope with the extra demands created by the school/college bridging programme for low achievers and the increased provision needed to respond to unemployment among young people.

Greater financial help to assist colleges in developing Business Education Council courses has also been approved by the ILEA. A number of colleges are to receive more than £60,000 to provide for the equivalent of 12 full-time posts.

However, this represents a substantial short fall on the original request of an equivalent 30 full-time posts made by 17 maintained colleges and three polytechnics. Especially as the allocation of £2,000 for this current financial year will be drawn from colleges' budgets.

A similar decision by Surrey and Oxfordshire County Councils not to allocate genuine extra resources has already led to confrontation between the National Association of Teachers in Further and Higher Education and the two authorities.

Grants call by college

A single more flexible mandatory grants system for post compulsory education is proposed by Napier College of Commerce and Technology in its response to the Department of Education's document, *Higher Education into the 1990s*.

The college, which has opted for Model E with parts of the model incorporated in the final policy, argues that more mature students would enter higher education if there were better grants.

It believes also that courses attracting mandatory grants should be greatly extended and that a wider range of retraining courses to meet broader social needs should be offered.

Napier says that if student awards were more flexible credit transfer could be introduced between particular types of institutions and levels of courses.

The college is confident that further education establishments would be able to contract after the 1985-87 student number peak if Model C was adopted.

But it opposes further reductions in the operating costs of colleges in the maintained sector. And it proposes that since the peak will be reached much earlier in further education, any surplus resources could be used to meet the requirements of higher education.

Although Napier is in favour of continuing the Robbins principle of does not rule out rationalization of course provision, to restrict student choice to places which are available at the time. But it is against any deferral of entry into higher education.

The college is firmly against increasing the age participation rate beyond 14 per cent in case this hits standards. In particular it believes that Scotland should not be accounted separately when making statistical predictions, as factors affecting the whole of the United Kingdom have equal bearing for Scottish education.

It argues that if present standards are to be maintained, educational planners will need to ensure that the proportion of suitably qualified entrants to university does not rise above existing levels.

Major collection gift for Bodleian

The Bodleian Library, Oxford, has been presented with the major part of the Broxbourne Library of the late Albert Ehrman, a noted collector and bibliographical scholar.

The collection, presented by his son John, consists of about 2,000 bookbindings of a wide historical range and about 400 catalogues of printers and booksellers, ranging from the fifteenth to eighteenth century.

Strathclyde hits at student cash plan

by John O'Leary

The governing bodies of Strathclyde University have taken the unusual step of issuing a joint statement with the students' association criticizing Government proposals for a new, two-part system of financing student unions.

Students, court and senate advocate a separate system for universities, possibly incorporating a minimum and maximum union fee to satisfy the desire for a less onerous commitment by the public authorities. They have sent their views to Government departments and MPs, as well as to the other Scottish universities.

The Government's proposals would be likely to lead to "open conflict between universities and the

electoral representatives of their students," the statement says. It would inevitably lead to competition for scarce resources.

It is felt that the present system—which involves scrutiny of the students' association's accounts by the university's senior finance officer, offers an exceptional degree of accountability and that any criticism on this score arises from isolated incidents at other institutions.

Student spending is said to be scrutinized at least as rigorously as other items in the university and this should not be undermined because of suspected abuses elsewhere.

An indexed range of subscriptions could be paid through the present

channels without interference with either university or union autonomy, says the statement. This is put forward as a fair system for universities, leaving aside the rest of further and higher education where differentials are greater.

A student spokesman said good relations had always existed between the association and the university authorities but it was a measure of both sides' feelings on the matter that an unprecedented joint statement had been issued. As one of the Scottish associations which have left the National Union of Students, the Strathclyde students have no formal representation in current discussions on the proposed changes.

The statement also says that the device of forming the polys as companies limited by guarantee is only one way of achieving what we regard as the desired aim. But there can be no doubt that this approach has much to recommend it; for it immediately establishes within the framework of the Companies Acts that the governing body provides the clear financial authority and accountability. As the report is seeking to achieve such a way that no individual governor can be other than aware of his responsibilities as a shareholder.

The secretaries argue that a corporate body is self-sustaining and more likely to attract large investments. At a practical level, the corporate status means that polys, as employers, could hire more direct and personal staff to polys, as companies.

"It is all too easy when responsibility is divided between management and a remote finance committee to blame one's failures and shortcomings on some unknown saviour at 'County Hall'," they say.

The main recommendations of the Oakes report were this week accepted by the Kent education authority. But it rejects the notion of transferring individual polys to direct control by the proposed national body.

Kent says also that the national body must have a balance of academic, technical and local education authorities and the colleges.

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More detailed prospectuses

Bristol University has agreed to give more information to prospective students—including A levels asked for and the places available on each course.

A working party on the publication of information on entrance requirements has reported that there is considerable variation in the detail on admissions procedure given to students in faculty prospectuses.

The university senate has agreed that faculty prospectuses should be more thorough and so help the students as much as possible.

In future prospectuses will say whether, for a particular course, interviews or visits are normally necessary. They will also state: the number of places available; the ratio of applications to admissions; what offers were made to students in the previous year (or before) and what A-level scores were eventually obtained by successful candidates. Information on staff research interests may also be included.

For example, a student will be able to see that applicants for engineering courses were offered places conditional upon obtaining a B and three Bs or better.

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British hopes in spacecraft

by Robin McKie

Science Correspondent

Schools at Sussex, Sheffield and University College London, will be keeping their fingers crossed today in the hopes that their experiments on the Geos-2 spacecraft will successfully survive lift-off.

For Geos-2, which is to be launched from Cape Canaveral today, in a second attempt by the European Space Agency to place a capsule in geostationary orbit where it will study the Earth's magnetosphere.

Last year, Geos-1 failed to reach a stationary orbit over Earth when the second stage of its launcher could not separate from the main rocket. Instead, the satellite swept into a low elliptical orbit and could not be used in correlation with ground-based experiments.

Although the failure of the project lay with the American's National Aeronautics and Space Administration who were responsible for the launcher, there was no insurance cover for the mission. Now the agency has had to provide a £19 million for a new satellite and launcher, and 15 per cent of the cost has been borne by the British Government.

The Geos-2 satellite was primarily a test back-up model of the original Geos-1 mission of the European Nuclear-Article next year.

It will also be transformed into a serious scientific instrument. The four main experiments—measuring device from the Mullard Space Laboratory and other instruments will also be transmitted to researchers at Sussex and Sheffield universities.

Although some data was recorded from Geos-1, a further blow to the research programme being carried out into the make-up of Earth's upper atmosphere and with which the satellite is concerned.

Geos-2 will carry scientific experiments from 11 research institutes in Europe and will also be the re-fuelled satellite for the International Magnetosphere Study.

AUT in battle for mature

by Ngain Crequer

University lecturers are to urge the TUC to prod the government into action to provide greater opportunities for mature students, women and the children of manual workers in higher education.

They also want the government substantially to increase its investment of resources in basic and applied research, as a major contribution to the country's technological division of continuing education.

This is the substance of two resolutions put forward by the Association of University Teachers at the Trades Union Congress annual conference in September.

The first resolution states that Congress welcomes government and TUC measures aimed at providing greater opportunities in higher education for people in the above categories but says practical proposals to implement this policy must now be set out.

Mr Laurie Sapper, general secretary of the AUP said this week: "What we want to know, first of all, is what grants will be made available for mature students to enable them to take up their opportunities."

"The academic resources can be laid out, but what will the government do to help. We welcome the grants for 16-18 year olds but it cannot stop there," he said.

The second resolution notes that the total per capita government expenditure in the United Kingdom on civil research and development is now among the lowest in Europe.

The AUP views it that research has suffered a damaging series of blows over a number of years, partly because of cuts in public expenditure and partly because its role has been devalued. There is a scarcity of resources at a time of technological sophistication which has led to a standstill in research. There are fewer post-graduate students engaged in research, and academic scientists have been attracted overseas. Unless the climate of opinion among government, universities and the country at large could suffer an irrevocable loss.

The Department of Education and Science is still considering the detailed ways of implementing lecturers' new pay scales.

Miss Angela Taylor, researcher in Islington history at the Polytechnic of North London, with Mr Michael O'Neil of Islington North, at the opening ceremony of an exhibition of the history of Islington. The exhibition which was at the House of Commons last week will be on view in Islington later this year.

Attract more adults to campus, Sheffield division says

A positive strategy to attract mature students into higher education should be implemented immediately, followed by a phased increase of adult entrants during the 1980s, according to Sheffield University's division of continuing education.

In its reply to the Department of Education and Science consultative document *Higher Education into the 1990s*, its staff argue that it is unrealistic to assume higher education institutions can suddenly turn their attentions to mature students in the 1990s and expect significant success.

"Little thought seems to have been given to the place of mature students in the 1980s. The number of 18-year-olds in the community is going to increase in the next few years. If, also, the number of 18-year-olds willing and qualified to enter higher education increases over the next few years, it could become increasingly difficult for mature students to gain entry to higher education in the face of severe competition from 18-year-olds."

By the 1990s it may well be the case that the proportion of mature students in higher education will be less than at present," says the division's reply.

Giving a cautious welcome to the sentiments of Model F, the division says certain measures will have to be adopted to pave the way towards such a policy. These include the extension of university preparatory courses and the widening of other access routes; greater cooperation between the spheres of higher and further education; preparation of mature students to the 1990s will conform to the pattern of adult student involvement in higher education of the 1970s.

The response spotlights the need for further research, and inquiries whether it has been anticipated that increased numbers of mature students in this direction. Such action will lead indirectly to increased numbers of mature students in higher education."

The division also sees the traditional role of the extra-mural department continuing: "There will continue to be a demand for such courses. They have importance in providing experience of university-type teaching for mature students."

"Work of this nature should expand as part of the overall strategy for mature students. Present regulations should be revised to enable extra-mural departments to initiate and pioneer new developments in this direction. Such action will lead indirectly to increased numbers of mature students in higher education."

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Turning point at London

by Maggie Richards

London University's extra-mural department has been undergoing major changes during its centenary year, according to Mr Brian Groombridge, the department's director.

In his annual report Mr Groombridge hails the past 18 months as a major turning point in the department's history. This period has seen the acceptance by Senate of the Wise report, which advocated the department's transition from extra-mural studies to a department of continuing education, designed to help the university respond to recurrent education needs.

The report also highlights the volume of the extra-mural department's work over the period, entering for 27,000 part-time students on 1,000 courses.

Now the department has to consider how best to relate or re-organise the resources deployed through its seven sections to make a better contribution to the diverse education needs of the region, Mr Groombridge says.

The report finds merit in both non-vocational adult education courses and those incorporating formal accreditation. "Although there is much in the contemporary culture to encourage superficiality and discourage persistence, thousands of men and women show real dedication by working many hours a week for three or four years, either for pure satisfaction or for the department's certificates and diplomas," it says.

"These awards are increasingly recognised, by this and other universities as providing an exemption for entrance to first and some higher degree work for those who wish to pursue their studies."

"The reorganization on which the department has embarked must not be at the expense of this most demanding work. On the contrary, there is some evidence that it must aim at improving access to it for more people and in more parts of the region."

But the department will also need to explore ways of relating adult education to whole sectors of the community, involving the development of appropriate curricula and the testing of appropriate methodologies. Mr Groombridge adds:

Warning that "100 can be a dangerous age," the report continues: "Previous reports have regretfully acknowledged that through the persistence of certain patterns of provision there were places in the region and sections of the public where the university's influence was not felt. Conversely, other milieux enjoyed a disproportionate share of its resources. In the light of the Wise report, the first steps have been taken to remedy this weakness."

University of London Extra Mural Studies Annual Report 1976/1977, published by the University of London Department of Extra Mural Studies, 26 Russell Square, London WC1B 5DQ.



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Satellite may herald era of space observatories

The complex astronomical satellite which helped British scientists discover a second black hole in the foreground of a series of space observatories in orbit by the end of the next decade.

And Peter Sanford, of London University College's Mullard space laboratory, said he expected most astronomy would be conducted from space telescopes by 1990. "People will regard earth-based astronomy in the same way as we would of string a telescope in a swamp," he added.

His comments were made following the announcement of the success of a UK team, working in conjunction with American researchers, in detecting a potential black hole in orbit about a giant star in the constellation Scorpio. The discovery was made last month with instruments on the American satellite Copernicus.

Using an X-ray telescope, placed on the satellite, the group has deduced that the giant star's companion must be a collapsed star. Their calculations indicate that this is so massive that it must be a black hole, an object so dense that even light cannot escape from its gravitational field.

The first black hole candidate discovered in our galaxy, known as

Cygnus X-1, is regarded with scepticism by some scientists. "The discovery of a second black hole is therefore highly significant," Mr Sanford added.

But the existence of these objects raised problems of philosophical importance, just as the universe started with the bang, so the end of stars in unobservable black holes was equally absurd, he believed.

And Mr Sanford stressed that X-ray astronomy would grow rapidly in importance over the next ten years until it matched optical astronomy in status. "However, we have got to increase the sensitivity of our observations, then the number of sources in the galaxy will rise tremendously," he said.

He believed the subject was particularly important because it dealt with very energetic stellar sources. "Fortunately, the Science Research Council rates X-ray astronomy very highly, although we always have to consider the most cost-effective method of putting instruments in orbit."

And he added that by the time X-ray astronomy had reached the same importance as optical astronomy, most telescopes, which were being developed would be for space observatories where the effects of the Earth's atmosphere would not interfere with observations.

Wave testing unit opens

A £100,000 wave-testing tank, which can reproduce all possible sea conditions, was opened this week at Edinburgh University. The unit, financed by the Department of Energy, was designed by a wave power research team led by Stephen Salter of the mechanical engineering department, and will be used in experiments concerned with generating electricity from sea waves.

A computer is used to control the tank's 89 separate wavemakers and this will allow far greater accuracy in the collection of data from experiments. Mr Salter said several other groups concerned with marine research had indicated they would copy the design of the tank in future and he added that they would also be making the unit available to the National Engineering Laboratory and various university laboratories.

The tank will be used to find the most cost-effective construction of "nodding ducks", the floating, pear-shaped bodies, designed by the team, which can convert wave power into controllable energy. "We know how to make these units but we have to find the cheapest way of constructing them to high enough strengths," Mr Salter said.

It was vital to build them strongly because of the "terrifying" power of waves, he added. And it is expected that the first floating power station, consisting of 10 30-kilometre string of about 1,500 "ducks", will come into operation by about 1985, although it would not be possible to produce electricity commercially until 1990.

A 30-kilometre station would produce about 1,000 megawatts of electricity. Mr Salter estimated the equivalent output of an average power station today. However, wave power would cost about twice the price of electricity today. "The usefulness of wave-generated electricity really depends on how much oil is liable to cost in the 1990s," he added.

Unusual degrees

Two unusual research degree courses in archaeology with an emphasis on method and science are to be offered by Southampton University this autumn.

The MA course in archaeological method, classes to be unique by the university, will focus on the rapidly developing fields of quantitative methods in archaeology. This will include computer applications and the use of explicitly theoretical models.

The aim of the MSc course is to give instruction in the technical research methods widely used in archaeology today. This will be both in the field of artifact analysis (centring on petrological study and trace element analysis) and environmental archaeology (with particular attention to faunal remains and prehistoric records).

Look at firms graduate needs

The graduate requirements of small firms in manufacturing industry are to be examined in a six-month research project carried out at Reading and Manchester and funded by the Department of Industry.

The work will be carried out by Mr Roger Brown, assistant careers master at Reading University, and supervised by Mr Brian Pott, director of the Central Services Unit, at Manchester, an umbrella organization which covers all the advisory careers services for polytechnics and universities in the country.

Mr Brown will limit his study to the South-East region but Mr Pott will keep a "running look" at the situation to ensure that the work does not reflect any in-built bias because of particular circumstances in that part of the country.

Mr Pott said this kind of exercise will help us to stimulate the market and increase the range of graduate opportunities. Many of these firms could extend their use of graduates.

Both the Departments of Industry and Education have in the past been critical of the lack of knowledge about industrial employment processes. As part of the research project, small firms with a good record in employing graduates will be chosen to ask what factors govern their

Firms which do not usually go into the graduate market will be asked to say what they are looking for in a prospective employee. First year students will also be asked for their views on their attitude towards small firms. The research grant is £5,000.

Acid environment

Bacteria survival in an acid environment is the theme of research being undertaken at Aberdeen University by Dr W A Hamilton of the department of microbiology, with funds from the Science Research Council.

Search for better CSE assessment

A search for more efficient methods of assessing candidates in the Certificate of Secondary Education is under way in Leicester University's school of education.

The East Midlands Regional Examinations Board has awarded a research grant of £44,000 to re-think the rapid increase in the number of candidates sitting CSE examinations. But the board expects a return on its investment in the shape of recommendations for cheaper assessment techniques.

Since the introduction of CSE in the mid-1960s, the number of candidates has risen from less than half the age group to the point where

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In particular, it will examine how far the further education service can help them meet the demands of regular job changes and gain the skills necessary. It will see how the content of the curriculum can be changed with periods of employment and helps make creative use of leisure time.

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Windscale waste to be studied by scientists

Scientists at Lancaster University have been given a £40,000 grant to examine what happens to radioactive materials carried in effluent from the nuclear plant at Windscale.

The grant has been given to the Department of Environmental Sciences by the Natural Environment Research Council.

Dr Simon Aston, director of the research, said this week that the project was designed to find out how low concentrations of artificial radionuclides moved through the natural environment, and was not intended as a monitoring exercise on contamination levels or hazards to public health.

The study will examine how environmental processes govern the passage and behaviour of radionuclides in the soil, streams, rivers, estuaries and coastal areas. At the same time radionuclides in the environment will act as tracers and will reveal more information about the natural pathways and processes themselves.

The research team will also examine what happens to radionuclides distributed in the environment from natural sources and through fallout from nuclear weapons tests.

Dr Aston will also study how the prevailing winds affect the distribution of low level concentrations of radioactive materials. It will be examining the extent to which radionuclides in the dried silt of the river estuaries around Windscale are blown inland as dust particles.

The study will be carried out in coastal and inland areas of Lancashire and Cumbria, including the Lake District.

The initial three year period of research will involve cooperation with the Freshwater Biological Association and the NERC Institute of Terrestrial Ecology.

Export performance gauged

Researchers from five countries have carried out 800 interviews throughout Europe to gauge the performance of British firms in foreign markets.

The study, financed by a £30,000 grant from the Social Science Research Council, is in the hands of Dr David Pott, of Bath University, and Mr Peter Turnbull, of University of Manchester Institute of Science and Technology. All three men have experience in industrial marketing and have been working on the project for 18 months.

They have found that different sectors of British industry perform in widely different ways. Too many firms have been found to suffer from the "English disease" of poor quality and unreliability, with the result that many still lag behind the field in export markets. Although forward-looking companies have restructured their marketing operations to adapt to

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Windscale waste to be studied by scientists

Scientists at Lancaster University have been given a £40,000 grant to examine what happens to radioactive materials carried in effluent from the nuclear plant at Windscale.

The grant has been given to the Department of Environmental Sciences by the Natural Environment Research Council.

Dr Simon Aston, director of the research, said this week that the project was designed to find out how low concentrations of artificial radionuclides moved through the natural environment, and was not intended as a monitoring exercise on contamination levels or hazards to public health.

The study will examine how environmental processes govern the passage and behaviour of radionuclides in the soil, streams, rivers, estuaries and coastal areas. At the same time radionuclides in the environment will act as tracers and will reveal more information about the natural pathways and processes themselves.

The research team will also examine what happens to radionuclides distributed in the environment from natural sources and through fallout from nuclear weapons tests.

Dr Aston will also study how the prevailing winds affect the distribution of low level concentrations of radioactive materials. It will be examining the extent to which radionuclides in the dried silt of the river estuaries around Windscale are blown inland as dust particles.

The study will be carried out in coastal and inland areas of Lancashire and Cumbria, including the Lake District.

The initial three year period of research will involve cooperation with the Freshwater Biological Association and the NERC Institute of Terrestrial Ecology.

Export performance gauged

Researchers from five countries have carried out 800 interviews throughout Europe to gauge the performance of British firms in foreign markets.

The study, financed by a £30,000 grant from the Social Science Research Council, is in the hands of Dr David Pott, of Bath University, and Mr Peter Turnbull, of University of Manchester Institute of Science and Technology. All three men have experience in industrial marketing and have been working on the project for 18 months.

They have found that different sectors of British industry perform in widely different ways. Too many firms have been found to suffer from the "English disease" of poor quality and unreliability, with the result that many still lag behind the field in export markets. Although forward-looking companies have restructured their marketing operations to adapt to

Over-16s project in job blackspots

Four areas with high youth unemployment will be the basis for major research into long term curricular alternatives for the over-16s.

The project, being undertaken by Youthaid, will look at the London Borough of Brent, Cornwall, Liverpool and Rotherham. It has been commissioned by the Further Education Curriculum Review and Development Unit.

The aim is to work on the form and content of a curriculum to provide for the wide ranging needs and interests of young people after school.

In particular, it will examine how far the further education service can help them meet the demands of regular job changes and gain the skills

Ngaio Crequer compares the lives of a university and a polytechnic don

University don

Dr Richard Etheridge, his wife and two children live in a sprawling five-bedroomed house, with a two-car garage, in the Midlands countryside. It might fetch £50,000. Their joint income is more than £20,000 a year, and he has travelled abroad, made radio and television appearances in connection with his work and has experience of college governing.

But it is not what it seems. The house is only possible because he built it himself. "I've spent my holidays for the last five years on a building site—home," he only allows himself £5 a week personal spending money, and his concern about career prospects has contributed to his decision to leave university life and try his hand at national politics.

Dr Etheridge was appointed a lecturer above the bar at the University of Aston in Birmingham in 1966. He lectures in production engineering in the department of production technology and production management.

He took his O levels while on National Service with the Royal Air Force, went to the Austin Motor Company as a mature apprentice and was sponsored in the diploma sandwich course at the then College of Advanced Technology in Birmingham, where he took his diploma in technology.

In 1962 he was a lecturer and then senior lecturer at the technical college in south Birmingham and was responsible for a great deal of the laboratory development in the fields of machine tools, production processes and quality control. While there he published a mathematics text book.

He gained a second-class degree in production engineering at the Birmingham CAT (later Aston University) and his PhD in 1976, for his research into advanced tool kinematics.

"I think it helped having been to the equivalent of a polytechnic. You see the problem from the other side. They have a more mechanistic approach. Students are not encouraged to look at an original problem."

"Not that I would criticise them. In many ways they have suffered from the same kind of prejudice that affects technological universities. Birmingham University still makes references to 'the tech down the road'. I would like to see more homogeneity although I would not favour a totally comprehensive higher education system."

In his department there are two professors, three readers, four senior lecturers and 11 tenured lecturers. It is one under establish-

Is the other man's grass that much greener?



Dr Richard Etheridge

Age: 44

Grade: Lecturer

Salary: £6,703

House: Self-built

Car: Land Rover, Maxi

Reads: Guardian, Sun

Daily Express

Ambitions: Politics

ment. Dr Etheridge is currently sharing a room which is being converted from a laboratory to a library. It says, misleadingly, "cybernetics" on the door. Although this is only temporary, it has lasted six months.

"Apparently we are 10 per cent over accommodated so rooms are being converted and there will be a big shift round. It means we will all be together, which will be a good thing." He will share his new room with a colleague but there will be enough space for them both to spread out.

"They will share a telephone. Professors and readers get one each but lecturers normally have to share. There are no problems about secretarial assistance. On average six members of staff 'share' a secretary."

"But as course tutor I had one secretary virtually looking after all my work, or at least making me a priority. Secretaries would normally type technical papers or even theses. I think we are much better off than polytechnics in this respect."

He spends an average of nine hours teaching per week in the first term, between 12-14 hours in the second and about nine or ten in the third. Virtually all his work is connected with first and second year students.

He spends two hours a week teaching on the postgraduate course and supervises two postgraduates in bio-medical engineering. In any one week he might spend up to five

hours on his own post-doctoral research, for which he is attempting to gain patents.

As course tutor he had responsibility for collating examination papers, organising examiners' meetings and looking after students who felt that justice had not been done. He is a member of three senate sub-committees, president of the local Association of University Teachers branch and is involved in branch meetings and coursework.

"I do a fair amount of individual tutorial work, but again the number of hours varies. I also have overall responsibility for all production engineering students with British Leyland. I visit the site about once a month to see training officers."

"My contract says I am employed to teach, carry out research and do whatever else my head of department may consider reasonable. Obviously there is a great deal of variation about things like free time. People can bend the rules but few do."

"But morale in the university sector, because of the pay row, is appalling. I am meant to get 13 weeks holiday but I have never had that since I came here. All I have ever taken is a week at Christmas and Easter days during the summer."

"We usually go touring in a caravan at Easter or stay at a family cottage in Wales. I think most university lecturers would have found it possible to go abroad up to about

1974, but not after that. That is the bitter complaint."

He earns £6,703 a year, "with no pension" and his wife earns £1,490 a year, part-time at a school for severely subnormal children. They have a girl of 13 who attends a local comprehensive and a boy of 11 attending them to public schools.

He owns a Land Rover and his wife uses it with the help of his son, renovating it. Austin Ruby. But in the motorway city does not drive to work. He uses public transport and buys a £7.50 travel card each month.

"I spend about £5 a week on personal expenditure, such as meat, groceries and petrol costs about £40 a week. All spare money goes on the house. I do a smok and rarely drink more than a glass of beer."

Local newspapers and one Sunday delivered and he reads the Guardian, the Express and the Sun in the university common room.

"I listen to the radio occasionally at the weekend. Beethoven, some of the classical overtures and working-class folk music."

"I have read all Neville Shute's books, all Howard Fast's, all of Frank Zola, 20 great engineers and scientists and a book relating to climbing the north face of the Elger. I also like Steinbeck, Mark Twain, Tolstoy, Ian Fleming and George Bernard Shaw."

His overriding interest is politics and he has been selected as the prospective Labour Party candidate for Halesowen. The university has agreed to give him a sabbatical of five years or the length of the next parliamentary term. He is a local party chairman.

The seat is Tory-held with a majority of about 800. If he gets elected Aston may be that it will lose another lecturer but possibly form a Labour-Labour MP Tom Lister, former teacher, who defends an even larger majority.

"Obviously I am standing because of an interest in politics but I also feel that number of lecturers are hunched at the top of a particular sector. Within five to six years of staffed, I could become a lecturer. The step to a chair would be more difficult at my age, 44."

He is aware that being at a university brings status. "People in the street seem to want to go to university. I deplore it, but it is a fact. There are only six universities in the country which are production engineering orientated. My staff are small in size. Many university lecturers feel career prospects are limited."

He feels he can probably do more for universities in politics than he can in his own sector. "I am totally committed to general education and I think that once we get off the ground universities will have a change," he said.

He is 42:5:1, the third worst of the polytechnic.

Derek Elsom is earning £6,051 a year and he would have to take a pay cut of £1,000 to take a university appointment. He has recently started work as an inspector and brings in an extra £2,700 per annum.

"I suppose it sounds a lot. It does a bit but I've never felt what you call 'well off'. It is only in the last two months that we felt we had enough money for a good holiday."

In common, no doubt, with the great majority of people, he is not quite sure where his money goes. He and his wife—she has no children—live in a modest three-bedroomed semi-detached house which cost about £10,000 when he bought it three years ago. Before that he had always lived in rented accommodation.

They try to save about £100 a month to pay for holidays or as at this moment, a deep freeze. They go to the cinema or theatre occasionally, and drop in at the local public house a couple of nights a week. Their car is a 1972 Hillman Avenger, essential, as Derek lives 22 miles away from the polytechnic.

He listens to Radio One or the local commercial station, "but mainly just for time checks." Television is on a bit of the time without anyone necessarily watching it. He listens to Wings, the Moody Blues or Leonard Cohen, "the pops rather than the classics."

He reads some science fiction but "I get quite a bit of reading from the Daily Mail and he reads The Times and the Guardian in the Common Room."

He has no interest in politics. "I know polytechnic lecturers are meant to be left wing and all that but it just does not interest me."

Derek Elsom is ambitious but not too strong and is prepared to wait until the right job with the right conditions comes along. "There are very few directions in which an academic life can go. I hope we will soon see more mobility. My chief aim is to establish myself as a researcher possibly at a university. I am always on the look out for a challenge. He saw a television job advertised which he might, he thought, be able to fit in on a part-time consultancy basis."

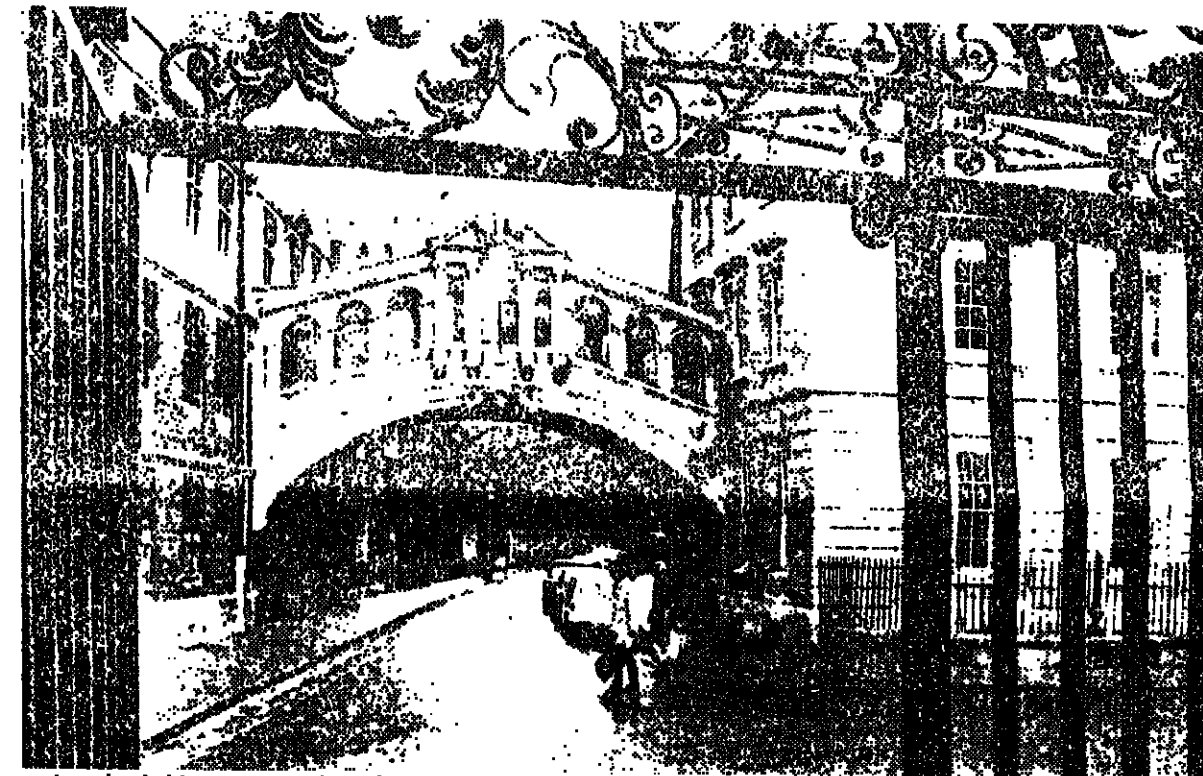
Could he be another Patrick Moore or Magnus Pyke, the advertisement asked. "I have been practising waving my arms around all day."

Building a bridge between town and gown

When Hertford College built a quadrangle on the far side of New College Lane.

Principal Boyd knew how he wanted to connect the buildings. Nigel Saul

recounts why it took 14 years for Oxford city fathers to be convinced.



In 1874 Magdalen Hall was reborn as Hertford College, the second college of that name to occupy the site in Cate St opposite the Bodleian Library. Never adequately endowed, the first Hertford College had collapsed in the early nineteenth century—parts of it quite literally collapsed—and the site had been acquired by Magdalen Hall. But an enterprising principal of the Hall, Dr Richard Mitchell, had it in mind to revive the name Hertford College, and his schemes saw fruition in 1874.

From the beginning the new college was the victim of its history. Like its predecessor it remained short of money; but for the moment it was shortage of space that was felt most acutely. As the college had just one quadrangle, the only room for expansion lay across New College Lane. For some years the college had been putting underpinnings in houses at the corner of New College Lane which it leased from the city, but finally in 1891, with a view to their ultimate demolition and replacement by a new quadrangle, Principal Boyd tried to buy the properties from the council which nevertheless was prepared to part with them only if Hertford gave property of equivalent value in the city in exchange. This "exchange of properties" is just about the least successful of the many exclusively documented episodes in the entire history of the college.

After tedious negotiations it was finally completed in August, 1898, and the college was free at last to build a new quadrangle on the site.

But if Hertford was to have two quadrangles, separated by New College Lane, how were they to be connected? The principal, Dr Boyd, had a scheme which he explained in a letter to the mayor in 1893: "I wish to have an underground passage for the servants and provisions and a bridge for the fellows and undergraduates."

A subway alone, in Boyd's view, was not enough; and anticipating objections to the bridge on aesthetic grounds, he went on to assert that the practical needs of an expanding college must take priority. The principal put the matter before the city council because the proprietors' rights of the college to do whatever it would with its own property were from clear.

At the Oxford Times pointed out (June 24, 1893) the presumption had been that the college's own property belonged to the freeholders on either side. Thus Hertford, owning the property on both sides, would hardly have needed to obtain the council's permission before building a subway bridge. This presumption, however, was challenged in the Public Health Act of 1875 which said that "all streets... shall vest in and under the control of the local authority."

Some years later the clause was interpreted by Lord Haversell to mean that "the main authority" such property, and for the property only, as it is, for the control, protection and maintenance of the street as a highway for public use."

Nevertheless Boyd, always diplomatic though wise to obtain the sanction of the council. This was regarded as done when the application for the subway was submitted. New College did not like the idea of the view of their chapel and tower being, as they saw it, ruined by the section of a bridge.

Their wardens the Rev J. E. Sewell, then in his 90s, and J. E. Sewell, then in his 60s or 70, years, of having taken kindly to the proposal, they had heard of Boyd's plan, the wardens and fellows of New College passed a motion op-

posing the bridge, and notified the Town Clerk to that effect.

Thus, even before it reached the General Purposes Committee on May 24, Boyd's application was facing opposition. Nor was hostility confined to the Common Room of one wealthy College. In the view of the Oxford Times, "a real necessity has been shown for a bridge, a subway answers every purpose, and there is no reason why fellows and undergraduates should be given a genteel passage all to themselves." Understandably, therefore, Boyd's application did not fare too well. The General Purposes Committee set up a subcommittee which reported on June 14 offering no recommendation. By then further letters had been received from the warden and fellows of New College reaffirming their opposition, and the committee voted to reject the bridge.

For the moment it seemed that Boyd would have to be satisfied with a subway, but even here the committee was rather grudging. In the belief that the hand of the street was theirs they claimed payment of a rent of £10 per annum. Boyd agreed that ownership of the land entitled them to prevent a subway being built without their leave but not to demand a payment of a rent.

In January 1899 Hertford accepted the council's conditions: a rent of £10 per annum and a tenancy by agreement of a year to year, which C. M. Jackson, the busman, wrote to accept these conditions on June 21, a week after the council had thrown out the proposal for a bridge; but on June 30 he wrote again to say that the college would proceed no further with the subway scheme.

It was not raised again for over a year until June 7 1900 when Boyd wrote to renew his application. Hertford was not entirely united over the question, for the minutes of a discussion in finance committee on January 29 1901 show that the busmen carried the day once more. As servants did not want it, it would hardly shorten the distance between the two quadrangles, and that it would rule out the future construction of a bridge. Although the council now offered to concede a lease of 999 years, no contract was ever sealed. If Boyd seriously intended building a subway in the event of not getting his bridge, the idea perished on.

In 1905 the principal had it in mind to try once more to get approval for a bridge. He had reason to expect that New College would no longer press their opposition now that the aged Sewell, who had died on January 29, 1903, was succeeded as warden by W. A. Spunner. Moreover, the council had recently grudgingly consented to the busman's proposal to build a bridge over Lotie Lane, a precedent which Boyd did not allow to pass unnoticed when he submitted his application to the mayor.

On June 29, 1905, C. M. Jackson, 11 it came before general purposes committee where it was once again rejected. Nevertheless it went on to be considered by a full meeting of the council on December 6.

The proposal that permission be granted was moved by the provost of Oriel, Dr Shadwell, who pressed the need for a bridge in view of the impossibility of a tunnel. The value of his argument was, however,

Hertford College's "Bridge of Sighs" with (right) Principal Boyd who fought so hard for permission to build it. Below is the view that Warden Sewell of New College did not want to lose.

somewhat reduced when the city engineer interrupted to say that, even though there was barely enough room, still no real difficulties lay in the way of the construction of a tunnel. Most of the provost's speech was devoted to the aesthetics of the case. His view that a bridge need not necessarily be unsightly was supported by Robert Buckell, now deputy-mayor, who was one of Hertford's most consistent supporters on the council.

Unfortunately for Boyd, Warden Spunner showed no signs of relaxing the opposition of his predecessor. Moreover, there was a body of feeling that Hertford by its persistence over the bridge was perpetrating an unfair advantage. As Councillor Kempson put it, "If businessmen brought up a matter time after time, after it had been rejected, like the university had decided to build only in detail from the drawings which the City Council had become so familiar over the years, Jackson had broken loose from the hold of the Gothic revival. There was an earlier copy reproduction of Jackson's bridge over the river at St John's College, Cambridge. Jackson abandoned Perpendicular Gothic in favour of a highly distinctive style combining English Jacobean with motifs from Venetian architecture."

In April, 1913, a tender for the job by Messrs Bowman & Sons of Stamford of £1,370 was accepted by the governing body. Meanwhile, work on the foundations was beginning, and in June Jackson's plans were given final approval. Early the following year, on 14 January, the opening ceremony was performed by Lord Haverhill, the memory of whose late husband, a barrister and former fellow of the college, the bridge was dedicated.

It did not take long for the bridge to become one of the most well-known landmarks in Oxford. Perhaps that was what Boyd really intended all along. One of his opponents on the city council, Alderman Hall, came close to the truth when he observed that "the bridge was considered to be an architectural feature, not as a matter of convenience". History has proved him right. A reluctance to climb countless steps means that except when it is raining most members of the college prefer to go from one quad to another at street level rather than by the bridge. But surely no one would deny that the bridge is an object of beauty in its own right and that for thousands of years from the Sheldonian towards New College. Even if the aesthetic judgment of Boyd's opponents has not received the vindication of history, they were not too wrong in discerning that the true significance of the bridge to Hertford College lay not in its utility but in its architectural prominence.

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was one of the most respected figures in the university, and his venerable persona lent an air of time-honoured eminence to a college that had only recently been recalled into being. He went out of his way to placate the city in 1907, when T. G. Jackson, the college's architect, first submitted plans for the request that the frontage be set back two feet, to widen the front path, though when the plans were reconsidered in 1911 he withdrew the proposals. The New Buildings had been growing apace between 1903 and 1909, when staircase four was completed, and by 1911 short-ages of money may well have improved a limit on expansion.

Nevertheless, when the new graduate numbers on the list of

of New College Lane made the question of communication between the two quadrangles all the more pressing. Even so, it would have been pointless renewing the application to build the bridge so long as the forces of opposition remained united and unrepentant. No doubt it was in order to placate possible adversaries that Boyd had been so anxious to satisfy the city over Holywell. But what made it possible for him to reopen the question was a change of heart at New College. Their opposition had been largely the opposition of old Warden Sewell, out of respect for whom Boyd was reluctant to force the issue. When the second application was tabled in 1905, New College had not wanted to lay aside their hostility with what might have been regarded as indecent haste. Thus it was 1913 before the time was ripe for the principal of Hertford to take up his cherished scheme for the third and last time.

When he knew that New College would not object, Boyd submitted his application on January 22, 1913. On Wednesday, January 29, 1913, the general purposes committee unanimously resolved to recommend the project for a bridge to the favourable consideration of the council.

The motion was proposed by Alderman Gamlen and seconded by Sir Robert Buckell, who had supported Boyd back in 1905. This time the bridge was easy. On Wednesday, February 19, the city council met to consider the report of the principal engineer Sir Thomas Jackson's plans before them. In the debate that followed it was once again Buckell who appreciated that the bridge, so far from being unsightly, would considerably add to the aesthetic qualities of that corner of Oxford. This time he was interrupted by applause, not heckling, and the proposal was carried with Mr E. R. Lewis the only dissenter.

Sir Thomas Jackson had submitted his design for the bridge 10 years earlier. He was no stranger to the Oxford scene. Fresh from his achievement as a barrister (1880-81) and Trinity (1883-84) he was already an architect of repute when he came to Hertford to erect the hall and the south block in the Old Ward (1887-89). He had also decided to extend itself across the street, it was Jackson who produced plans for the New Buildings and for the bridge which was to connect them to the Old Ward. The bridge as executed differed only in detail from the drawings which the City Council had become so familiar over the years. Jackson had broken loose from the hold of the Gothic revival. There was an earlier copy reproduction of Jackson's bridge over the river at St John's College, Cambridge. Jackson abandoned Perpendicular Gothic in favour of a highly distinctive style combining English Jacobean with motifs from Venetian architecture."

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Clifford Healey (left) and Francis Evans suggest how to promote better understanding of engineering

Proficiency in language basic need

Some time ago Dr George Tolley outlined some of the grave defects in engineering degree courses. These he identified in the following way: "courses were overburdened with outdated facts and theories; they were remote from the technological, social and intellectual problems of production, and they lacked credibility as general education, being viewed on much as specific training for a specific career. More recently we have learnt that industry requires generalists, not specialists, that we should educate engineers for uncertainty, and that an engineering degree 'should be looked upon as a valuable launching pad for occupations other than engineering'."

There is little doubt in my own mind, as a teacher of engineering students, that there is a great amount of truth in these views. The professional debate centres around change in engineering courses. The Chilvers committee recommended that more attention should be given by universities and polytechnics to improving the art and practice of communication.

It is here in many instances that engineering degree courses lack credibility as general education. This is one of the major areas for future concern. Education should be seen as a "leading out" which places an emphasis on communication as an essential part of an educated person's equipment for life and it is vitally important for the future of the engineering profession in Britain that engineers are given a greater degree of training in their native language than is the case at present.

Many otherwise competent engineering undergraduates are greatly handicapped by their fundamental inability to master even the rudiments of the English language. Students who at short notice will become professional engineers, possibly fill future managerial positions, cannot sort out differences in tenses, use idiomatic expressions correctly, and most serious of all from an employer's point of view, cannot spell the most elementary of words. It is crucial that an emphasis for greater than any other, for visualized, will need to be placed on this aspect of an engineer's education.

Engineers themselves are often lukewarm about the benefits conferred by literacy, seeing it as something they did not feel comfortable with at school, or in higher education as something peripheral to the main task of acquiring a skill which will equip them for their future career. This is an attitude which gains sympathy when set against the overburdened degrees where there is little time to cram in more than two hours a week for putting right linguistic weaknesses "built-in" throughout a school career.

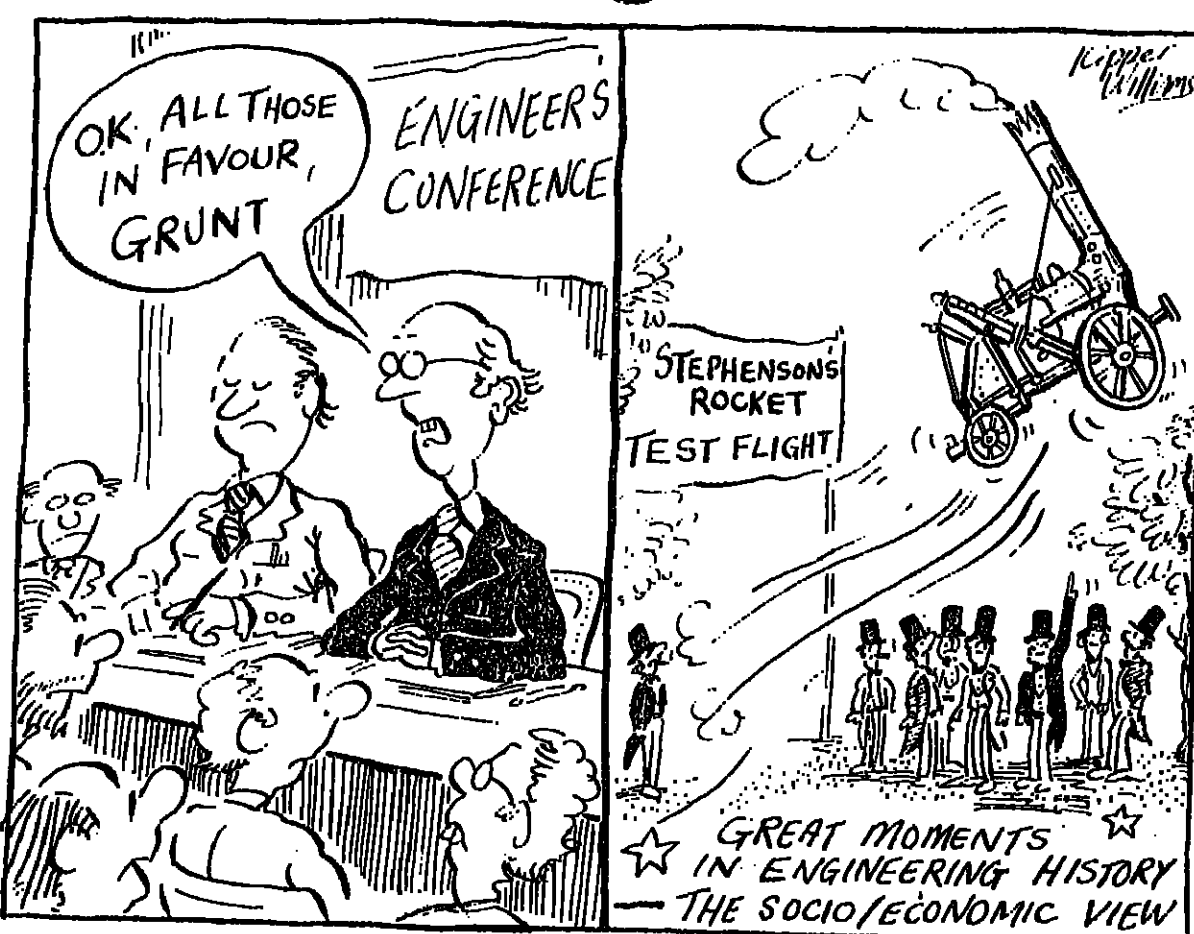
But this attitude, which many vocational students have towards language, is in itself a symptom of the way in which engineers see themselves and reflects the narrow notion of specific training referred to by Dr Tolley. Is it any wonder that such courses should lack credibility as general education?

It is certainly an attitude which misses the vital point that language itself is not something outside the main engineering subjects, but is intrinsically a vocational asset of paramount importance. Language is our most human characteristic and it is understanding a case to suggest that the need to communicate ideas in a clear and concise manner so that others can understand what is being said, is fundamental to the notion of higher learning as a whole.

For engineers it is an important aspect of their training in language that they learn how to write a technical report, how to speak clearly and to the point in public or at committees and how to formulate their ideas on chosen topics. But this aspect of language is insufficient in itself for general educational purposes. It remains solidly rooted in the tradition that relevant instruction must be vocational.

Moreover, it is primarily methodological. Practice in the construction

Across the great divide



of reports is important, but nevertheless insufficient. It will not make the student sensitive to the nuances of language nor will it alter radically his inability to express himself in written or oral work. There are, however, areas of general study which will improve the student's grasp of language which embody ideas and stimulate imagination, but it is not enough to argue, as many engineers do, that all the student needs to know is how to write a technical report.

Peter Abbs, in his recent book, *Root and Blossom: the Philosophy of English Teaching*, argues the case for a view of language which places the person at the centre and views it as something which flows from a person's whole make-up and character. And while in Abbs's book this idea is related specifically to schoolchildren, it is also applicable at higher levels of education. It is sensitivity to language which matters and which must be cultivated and that can only be the fruit of an involvement in humane studies.

Students of engineering and other vocational subjects need to broaden their knowledge of other areas of life and learning and there is an urgent need for members of professional engineering bodies to encourage it. Engineers are people and they need to understand this side of themselves as much as they understand their vocational role.

Max Black has made the point in *Science, the Humanities and the Technological Threat*, that "science... has only a limited and partial educational value because, in its search for objectivity, it is committed to suspending certain distinctively human interests and preoccupations". This also applies to the world of technology and to the language of technical writing which is precise and factual and leaves out the world of the language of the self which is based upon feeling.

Black characterizes this objectivity as the "language of science". We use the language of the self that science cannot encompass, "to express in multifarious ways, feelings, attitudes, intentions, fears, aspirations, the whole gamut of the so-called 'non-cognitive' uses of language."

Lip service is often paid to the notion of liberal education within the engineering curricula, but as conceived by its pioneers it is now becoming increasingly unrecognizable. Vocationally orientated disciplines are seeking to narrow the gap which separates them from liberal education so that many teachers of arts subjects are being pushed into absurd acrobatics in an endeavour to find a correlative relevance for their fields of study. This means

once again compliance with a narrow and misconceived notion of relevance. I have seen Council for Academic Awards submissions which talk about literature that will place the main emphasis on an engineering content which in reality is not present in the work. In fact it is debatable whether there are any literary works which are emphatically "about" engineering.

There is talk of "types of structure", the phrase used naively to describe a chord of relevance in an engineer's mind. There is certainly an architecture of literary narrative, but it is not a structure of blocks and mortar and steel and plate glass. The humanities are concerned with human relevance and if they do not succeed in this sphere they do not do so totally. It is merely perverse to exact from a discipline more than it can give simply for the sake of fitting into a vocational blue-print.

It is in the long run vitally important to see that we do not slip into the error of assuming that technology will solve all our problems, to see on the other hand that we do need to help students become aware and sensitive to the human and humane. They need help in this personal area as well as they need instruction in factual knowledge.

This will not be achieved with more personal study time, or cramming in more vocational skills, but by broadening courses sufficiently to give students the necessary insight and ability to eradicate prejudice and provide them with mature judgment in values. In practice this will involve a greater degree of training in linguistic and oral skills within a flexible range of courses which broaden their minds in a general way.

We must strive to guard against the situation described by Lewis Mumford as a "bias against the personal" in western society, where human values, purposes and ideals have lost credibility in the emphasis which has been placed upon the physical, biological and technological sciences. In the summary of this "bias" provided by Titmuss in his book *Living Issues in Philosophy* we can visualize the dangers inherent in too narrow a vocational perspective:

"Science has tended to reject the unique, the non-repeatable. This neglect of the inner life explains in considerable part the lack of confidence, the confusion, and the loss of sense of direction that ultimately can lead to the decline of civilization. Modern man now appears to be the victim of his own instruments. We are discovering, however, that we cannot achieve fulfilment or even satisfaction by neglecting the human element."

The author is lecturer in charge of English at Dundee College of Technology.

Outsiders must make effort, too

The debate on the poor performance of British industry has begun to identify a weakness in engineering, as one of the root causes. Whatever may be said about economic or social factors, such as investment or labour relations, there remains a substantial gap which can only be explained by British failure to produce goods which people want to buy. Marketing and labour problems alone do not explain the dearth of the British motor cycle industry, or the domination of the home market by foreign slide projectors, sewing machines and other small modern consumer goods.

Efforts are being made to raise the standards of engineering education and to tempt a better quality of entrant, but this is merely a partial solution. Until the education and training of non-engineers changes, we shall not have a situation in which good engineering can play a part.

In Britain, the problem is an old one. The powerful engineers—Watt, the Stephansons, Brunels and Parsons—have become rarer, and power has increasingly come to lie with economists, marketing men, accountants and "Managers". Engineers, innocently, have accepted these changes and have done their best to meet them half way by including financial and managerial courses in their syllabuses.

Yet where do we find the accountancy, economic or social studies, courses which contain a genuine attempt to explain the basic elements of engineering? As an historian who went on to think with the history of engineering, I am constantly dismayed at the failure of non-engineers to grasp anything of the fundamental nature of engineering thought. The gap is so wide that non-engineers that here is an area of thought which is vital but which they do not begin to comprehend.

In part, no doubt, the problem lies with the nature of engineering itself. It takes place in the real world, not

a laboratory, and the public does not like a brilliant idea, which cannot be made to work. Engineers, like doctors, find that experience is sometimes more valuable than theory and that for problems needing a quick, not an ideal, solution the best thing is "to suck it and see".

Again, engineering lacks some of the beautiful clarity of much science. Engineering can give many solutions to a single problem. Further, more science, like economics and other highly rational subjects, is very explicit. The arguments are written down, and they tend themselves to academic study. It would be harder to say exactly why the Spitfire or Volkswagen were classic designs.

In part, too, engineering is poorly served by its popular press. The public at large do not distinguish clearly between technology and science, and expositions like D.S.I. Cardwell or the late L.T.C. Ball are rare.

Whatever the difficulties, a serious gap exists in the education of many of our professions. People can study modern history and yet not have the slightest idea of what James Watt actually did to the steam engine. They can learn about the American system of manufacture, and yet never see a machine tool. They have no idea why the internal combustion engine lent itself to flight or to personal transport. And least of all do they have any conception of the modern revolution which has led from Babbage's mechanical computer, through the old-fashioned valve to the modern microcircuit which can process any information that can be automatically controlled by process we choose to define.

We easily ignore this whole category of thinking because our normal system excludes it. It is natural in our present way of thinking, for instance, to dwell upon the political relationship between Churchill, Chamberlain and Tizard while radar was being developed. Yet the fundamental question, surely, is whether alternatives, like sound locators or staking out of aircraft could not be the need as radar did, and see simple technology is needed to deliver this.

Another example is the case of the motor carriage of the 1830s. The usual attitude is that they were well made and that turnpike trusts and horse owners stopped the carriage development. The truth is that the vehicles were technically inadequate in ways that require an engineering explanation. When it is known that the *Two Cultures* twenty years ago it helped the move to liberate scientific and engineering education. Yet we easily forget the converse, that an educated man should know something of thermodynamics as well as of Shakespeare. Somehow this first industrial nation, heavily dependent upon its technology, has suppressed engineering considerations from its collective consciousness.

The importance of providing a better appreciation of engineering does not stem simply from the weakness of British manufacturing. It extends, also, to the future changes which will come from the exhaustion of some raw materials and energy sources, and which will come with the application of new technologies—the fashionable sample is nuclear power. It will be a difficult task to establish a proper understanding of the nature of engineering thought and practice in an intellectual environment whose assumptions are predominantly biased in favour of the economic and social, and against anything but a secondary role for the engineer.

It is most important, however, that this gap should be filled by the teaching which emphasizes the nature of engineering itself and does not use the opportunity for further emphasizing the social and economic causes in change. These are already well provided for elsewhere, and all too often the attempt to discuss engineering slip into anti-technological or ideological attacks on our social institutions.

At the highest level, neither engineering nor any other field of knowledge is autonomous: they intersect. But at the level of the pressing needs described in this paper, engineering must be allowed to stand by itself.

The author is principal lecturer in the Department of History at Sheffield Polytechnic.

Is Popper more relevant than Bacon for scientists?

L. Jonathan Cohen calls for a return to Aristotelian values

Certain sections of the scientific hierarchy in contemporary Britain are sometimes criticized for being more interested in advancing the frontiers of human knowledge about fundamental natural processes than in developing techniques to exploit the fundamental knowledge that we already have. For example, they want more and more powerful atom-smashers, we are told, so that less money is available for medical research.

On the force of such criticisms it is difficult to assess. Those who are critical can always claim that a new breakthrough at the fundamental level might turn out to have, at some stage, an immensely valuable technological spin-off; and indeed this might even be true. Accordingly, we have to look at pre-scientific philosophies rather than at the scientific method about priorities. We have to look not at what scientists actually do but at their prevalent conceptions about the nature of science.

Of course, very many (perhaps most) scientists are uninterested in the philosophy of science. But among those British scientists who are so interested no philosopher is more widely read or respected today than Sir Karl Popper.

How then does a Popperian scientist conceive scientific inquiry? For him it is a process whereby hypotheses are conjectured to solve problems and are then tested as severely as possible. Progress is achieved when a hypothesis, that cannot stand up to its tests is replaced by one that is no less informative but more successful, or when a less informative, though successful hypothesis is replaced by a more informative and equally successful one.

Informalness increases with explanatory potential, and is measured by mathematical improbability.

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The holder—the more improbable—the hypothesis that survives its tests, the greater its scientific value. There is therefore no role in science, the Popperians say, for attempts to assess evidential support for a hypothesis, and no need for philosophers of science to construct an inductive logic that articulates normative principles for such attempts. Once a hypothesis has been proposed, Popperian scientists seek only to falsify it or to measure its informativeness, not to assess the evidential justification for thinking it true.

The Popperian view provokes a very simple question: what, then, is the point of science? What justifies its pursuit? Why should the community pay for it?

Francis Bacon thought that the proper aim of scientific research was to give men power over Nature. He consciously rejected Aristotle's conception of theoretical enquiry as something that was self-justifying, and the great seventeenth-century British scientists took their cue from him. In striking contrast, Popper's view of science seems to represent a return to Aristotelian values. Popperian science, with its pursuit of unfalsified informativeness, treats intellectual satisfaction as its sole goal.

And there is an intimate link here between value-system and epistemology. Bacon tried to construct an inductive logic whereby scientists would be able to tell when the evidence produced by experiments and controlled observations made their hypotheses more reliable. In this way his theory about the proper way to evaluate scientific hypotheses was slanted towards the purpose for which such hypotheses were worth having.

If the aim of scientific enquiry is to give us power over Nature, we cannot do without some way of appraising the evidential justification for relying on a given scientific hypothesis. If we go up in a new kind of plane, or take a new kind of medicine, we want there to be adequate test-results to show that it is reasonably safe.

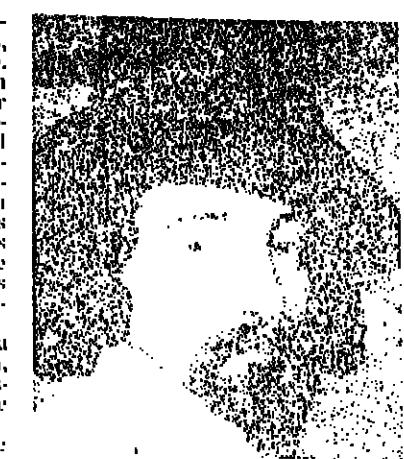
Popperian scientists on the other hand, cut itself off from technological objectives, because its epistemology rejects inductive reasoning. The aim of scientific enquiry is to give us power over Nature, we cannot do without some way of appraising the evidential justification for relying on a given scientific hypothesis. If we go up in a new kind of plane, or take a new kind of medicine, we want there to be adequate test-results to show that it is reasonably safe.

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Francis Bacon



Sir Karl Popper

reasoning. There is no way that a Popperian can adopt a Baconian conception of scientific purpose without at the same time giving up his evaluation of hypotheses by their unfalsified informativeness, and adopting instead some criterion of evidentially-based reliability. Not that a Baconian logic despises informativeness or explanatory potential. Just the opposite. But it does not measure this by mathematical improbability, and it does not identify unfalsified informativeness with reliability.

You would not wish to trust your life to a plane, or a medicine, which had been made in accordance with the boldest conjectures that have hitherto resisted falsification. Nor, perhaps, is that the kind of science which you would willingly pay heavy taxes to sustain.

My argument here is not that Popper has wholly misrepresented the nature of actual scientists' reasoning. It could be that even before reading Popper's writings some scientists have actually applied Popperian criteria of appraisal to their hypotheses. Others no doubt think themselves to have derived value from his inspirations from those writings. And some of Bacon's ideas have been echoed by Popper, such as the preference for explanatory

theories that generate novel and subsequently confirmed predictions. Nevertheless, Baconian appraisals of reliability, not Popperian appraisals of unfalsified informativeness, are what most communities have sought, and still need, from their scientists, in relation to the hypotheses that the latter put forward.

The crucial Baconian requirement is just that we should know how reliable are the predictions that issue from a scientific theory. Then the theory can at least in principle be put to work.

Nor am I arguing that there is anything at all unworthy in individual scientists being motivated by intellectual curiosity or even personal ambition. The claim is rather that the social justification of the enterprise has to lie elsewhere. The overall, long-term aim of scientific research has to be seen as human power over Nature, or, if that metaphor is now unacceptable to environmentalists, then at least the aim must be to learn how we can ally ourselves with Nature.

It follows that our conception of the knowledge that science seeks should be structured by appropriate criteria of evidentially-based reliability. If too many scientists adopt a Popperian philosophy, an inappropriately conceived of scientific knowledge will become influential and the Baconian objective will lose much of its guiding force.

Two final points. First, it may well be said that Bacon's (or J.S. Mill's) inductive logic is altogether too coarse for modern purposes, and too mixed up with idiosyncratic ideas about the correct order of procedure in scientific investigation. After all, modern science was very young indeed when Bacon wrote, so there was very little experience to constrain his analysis. But in recent years the underlying principles of Baconian logic have shown themselves capable of development up to a quite sophisticated level, and Bacon's logic—not his heuristics—is all that is philosophically concerned with here. So philosophy can certainly offer an adequately systematic alternative to the Popperian criterion of evaluation for scientific hypotheses.

Secondly, perhaps some people may think that Popperian science is science as Popperians conceive it—a respectable social ideal. "Popperian science is not to be justified," we may be told, "by its being an activity that satisfies the intellectual curiosities of those individuals who engage in it, but rather by its being a grand collective product of human curiosity in general. It deserves the support of society at large in much the same way as great art or great literature does."

But then we should need two kinds of science—Popperian science for intellectual glory and Baconian science to help us in our dealings with nature—and it is difficult enough for society to afford even one kind. Moreover, Baconian science can serve both purposes. Bacon himself pointed out that having a general power over nature is necessarily more valuable than any particular exercise of that power, and also that the utility of scientific knowledge is a pledge of its veracity. So a Baconian scientist, unlike a Popperian, can see the pursuit of scientific truth and of intellectual power over nature as one and the same objective.

The author is practising in philosophy at Queen's College, Oxford.

ITV network, 10.30 pm Tuesday, 18th July

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Trident Television Award for Communication in Science 1977/78

In conjunction with the British Association for the Advancement of Science

Labour's Carlylean hero

Kear Hardie: the making of a socialist
by Fred Reid
Croom Helm, £7.95
ISBN 0 85664 624 5

In recent years hagiography has been giving way to historical objectivity in interpretations of the life of James Kear Hardie, notably in the biographies by Morgan and McLean, but he still remains something of an enigma, especially in his early career, partly through lack of evidence and partly because of the gyrations in his political views and behaviour.

Fred Reid, lecturer in history at Warwick University, concentrates on Hardie's formative years—his childhood, adolescence and early career in trade unionism, journalism and politics, up to his membership of Parliament in 1892 which ended with the crushing electoral defeat of 1895. By analysing all the available source evidence for these years, he seeks to achieve "an understanding of the complex process by which Hardie's personality (both private and political) was formed", removing the "veil of myth and obscurity" with which the "early hagiographers shrouded the origins of the legendary hero", and at the same time providing a much fuller account of Hardie's early life than is available in the more recent biographies. The subtitle of the book indicates the author's main theme, "the making of a socialist", in which he differs from others who have doubted the depth and extent of Hardie's socialist convictions, by comparison with his radical or progressive class-collaborationist "labourism". Indeed, the turning-point in Hardie's life is portrayed as a sudden "conversion" to socialism in 1887, almost like the light that struck Paul on the road to Damascus.

While there will still be serious doubts about this socialist enlightenment, the author's general interpretation of the formative influences in Hardie's early life carries conviction: the substance of illegitimacy, spurring him to efforts at elevating his social status (Hardie liked to imagine his father with the bourgeois respectability of a doctor rather than as, in fact, a miner); the poverty and hardship of his early family and working life in Lanarkshire coal-mining, producing a sense of class-exploitation; the rural environment of many pit villages, creating a backward-looking love of the countryside and dislike of urban industrialism; the labouraristocratic traditions of skilled workers, encouraging a sense of independence and differentiation from the lower working classes; his self-improvement, evangelical religious involvement and temperance work, with emphasis on self-help, thrift and moralising, combined with critical condescension and disapproval of drunken ignorance among the lower masses and with middle-class collaboration; the influence of Thomas Carlyle's writings, with emphasis on the role of the popular (though undemocratic) heroes, firing Hardie's notions of charismatic leadership and contributing further towards his ambivalent class attitudes.

All these influences are shown to have produced a complex, even ungraspable personality, but they can be fitted into a more straightforward assessment of Hardie's motivations and changes of course in his early career. The most outstanding feature of almost all working-class leaders in the nineteenth century, as now, is their drive to escape from the working class and to achieve something like bourgeois status and respectability, while still basing their power and influence on leadership of the masses. Emphasis on class solidarity masks their main motivation, which like that of most other people is basically self-interest. If Hardie's main concern is seen as the career advancement of James Kear Hardie, then most of his other widely almost inevitable twists and turns become intelligible.

The main routes of escape from working-class drudgery (before modern higher education) were trade unionism, journalism and politics and in these ways Hardie soon ceased to be a working miner. As Reid says, he was a devoted follower



"The Labour Leader" as portrayed by a contemporary cartoonist.

of Alexander McDonald, leader of the Miners' Association, but a believer in class collaboration, who had achieved comfortable economic independence and became one of the first two working-class MPs in 1874.

After the failure of Scottish miners' strikes in that year, Hardie became deeply involved in class-collaborationist self-help, evangelism and temperance activities, developing an ambivalent view of class relationships; but this experience in class leadership enabled him to become secretary of his local (Hamilton district) union, as a test case of the following year, after being dismissed from work for his trade-union activities, he got himself appointed paid agent for that district in a new Lanarkshire miners' union. Under rank-and-file pressure, there was a prolonged strike against wages reductions in 1879-80, in which, however, Hardie's ambivalence was clearly apparent. After its collapse, therefore, he moved into Ayrshire in 1881, where he at first became secretary of the miners' county association, but when they could not pay his full salary he got himself a reasonably safe lower middle-class position as the local (Cumnock) editor and mine correspondent for the *Ardrossan and Saltcoats Herald*, resigning his union post.

In this role, until 1886, Hardie's social position became more strongly marked by an ambiguity which "remained characteristic of him throughout his life and in the key to the ambiguities of his political outlook and actions. He wanted to be the spokesman of the class, but he was resolved not to live among the communities of his class, sharing its hardships and oppressions." He became thoroughly class-collaborationist, involved in temperance, and good works for the poor, advising moderation in strikes, and adopting a condescending attitude to the masses; in politics he was a staunch Lib-Lab Gladstonian, putting temperance, self-help, "cooperation" and moral

independent Labour candidate in 1888 (though probably deriving some of his electoral funds from Conservative agents).

He finished bottom of the poll, however, and the SLP also proved disappointing to his political ambitions. Envisaged as a broad-based alliance of trade unionists, radicals and socialists, with a progressive labourist programme, it was riven by divisions and failed to provide a serious challenge to the Liberal Party in Scotland.

Like McDonald before him, therefore, Hardie "had to look to England for a route of entry into the House of Commons". Through his London contacts, he was invited in 1890 to become a candidate for West Ham South. Resigning his secretaryship of the Ayrshire miners' union, he eventually won this seat in 1892 with a broad appeal to the temperance and non-conformist as well as trade union, radical and socialist voters. He now sought—through his parliamentary membership and his autocratic editorship of the revived *Labour Leader*, as well as through the TUC (though he failed to get himself elected as secretary of its parliamentary committee, "because the English miners would not have him at any price")—to create an Independent Labour Party, in the establishment of which at Bradford in January, 1893, he played a leading role and of which he became president; indeed, he now glorified himself as "Labour's Carlylean hero", the "great leader" of the masses.

Despite his swing towards independent labourism and socialism, however, "he remained encapsulated in a middle-class life style", remote from the hardships and sacrifices of the poor, for whom he expressed compassionate condescension, proposing to regulate "farm colonies" for the unemployed, while building for himself, with considerable aid, a large country house at Old Cumnock (like latter-day Labour leaders with their rural mansions, had little trouble, in fact, in milking financial contributions from middle-class sympathisers).

Support of his own political position, his paper and the ILP, which he sought to dominate. His limited views consequently continued, at a mixture of Christian and Fabian, forism, radicalism and labourism, for which he was attacked by the more militant class-conscious SLP. It was only with considerable reluctance that he was lured into direct opposition to the Liberals in the general election of 1895, in which 28 ILP candidates, including Hardie himself, were crushingly defeated.

That Hardie's "conversion" to socialism and the brotherhood of man should be treated with some reserve is also evident from his denunciations of Jewish and other immigrant workers—"heavily, filthy, and from his stomach—support of British imperialism, whose civilizing mission was to establish the Anglo-Saxon world in world order"—even the morally depraved prior in British cities were evidently preferable to the racially inferior in foreign lands.

Not surprisingly, Hardie has long been an "original" to those who would like to visualize him as a selfless champion of working-class aspirations. While his proletarian upbringing certainly produced in him strong feelings of class exploitation and class solidarity, it also imbued him with an even stronger sense of labouraristocratic superiority and self-centred ambition to escape from the working class and to achieve personal status and power, through leadership of that class, or through collaboration with financially powerful politicians, should not, in fact, be regarded as crusading idealism but as individuals out for their own ends as well as those of the class they hoped to manipulate, and who are often persona rivalry with other labour leaders.

This book provides the basis for a more lifelike assessment of perhaps the most saintly figure in Labour's hagiography.

A. E. Musson

Town life

English Towns 1500-1700
by John Patten
Hasson, £1.00
ISBN 0 208 61721 6

This thorough and comprehensive study of early English towns, by a geographer, is a considerable addition to the growing literature on the pre-industrial city. The author knows his way around the period, and his bibliography of notes alone would justify a book of this kind.

His account of the major, the incomplete, sources of urban life—tax returns, rolls, parish registers, wills, manorial and indentures—is particularly helpful.

The work is largely devoted to the author is at pains to emphasize the differences between the towns and other urban historians, all of whom are mentioned somewhere in the text, but in his own words, "the original material is much better than the secondary material". The book is a valuable contribution to the study of the town, particularly in the visual aspects of the town, and on occupational structures, which the author has assembled with care and incorporated into the text.

He sees population change as dominant influence on the development of towns, secular changes in wages, both urban and rural, and the terms of trade between country and town. He concludes that the proportion of town to rural population rose from 10 per cent in 1570 to 20-25 per cent in 1670. Migration compensated high urban mortality and was key to urban expansion, as long as migration was not declined in the seventeenth century.

Among the numerous other points discussed, are the rural character of towns, the moment of their appearance, the changes in marketing, the complexity of quite small towns, towns were generalized rather than specialized in their economic functions, which occurs only in a partially controlled form in Newton's fluxions. It is the use of infinitesimals, in Leibniz's view, "they can certainly be used as ideal concepts which shorten the argument, similar to what are known as imaginary roots in algebra". Now the trouble with this view is that, as stated in detail by Leibniz, it has inherent contradictions (two numbers which differ infinitesimally are to be identified, but not if one of them happens to be zero, and this identification has to preserve addition, which the Leibnizian condition prevents). None the less, this view was the predominant one until the second half of the nineteenth century when Weierstrass (principally) formulated a much weaker way of talking which was strong enough for the calculus, as Leibniz's view was destined to remain at the heuristic level.

In the past 20 years there has been a complete reversal of this view. In 1928 Schmieden and Borel constructed an enlarged calculus system, though one that was not that of division was no more than is known about the logical reality of the town, the harder it seems to be to explain change plausibly except in terms of the forces of change, though perfectly correct, is rather pedestrian and tautological: "Urban change consequent on economic change occurs but it was uneven and generalized in effect over the towns".

His conclusions, based as they are on historical data, tend to be cautious, negative and diffuse. There is more than is known about the logical reality of the town, the harder it seems to be to explain change plausibly except in terms of the forces of change, though perfectly correct, is rather pedestrian and tautological: "Urban change consequent on economic change occurs but it was uneven and generalized in effect over the towns".

Richard Grassby

Cambridge University Press has published at £4.50 a bibliography handbook on *The High Middle Ages in England 1154-1327* compiled by Bertie Wilkinson for the Centre for British Studies. The book covers all aspects of the period, with sections on political, economic, cultural and religious history. The series is designed to help scholars and advanced students in their studies and also serve as a basis for research.

Close-up on cells

Structure and Function of Cells
by Colin A. Hopkins
H. Saunders, £3.50
ISBN 0 7316 4775 8

This latest book on the structure and function of cells is aimed at biology university students, particularly those reading courses in basic medical sciences. As such it is a highly competitive market since there are already at least a dozen well published texts in this area. Including the excellent *Cell Biology* by de Robertis from the same publishers. What makes this book a little different from its competitors is that the author has tried to capture "something of the excitement and enthusiasm that pervades the subject at present" by the author is at pains to emphasize the differences between the towns and other urban historians, all of whom are mentioned somewhere in the text, but in his own words, "the original material is much better than the secondary material". The book is a valuable contribution to the study of the town, particularly in the visual aspects of the town, and on occupational structures, which the author has assembled with care and incorporated into the text.

The first part of the book is concerned with the techniques that are used to study the structure of the cell. A range of microscopic techniques are described and method-

of preparation are explained. There are also brief accounts of a number of analytic procedures including autoradiography, tissue culture and cell fractionation techniques.

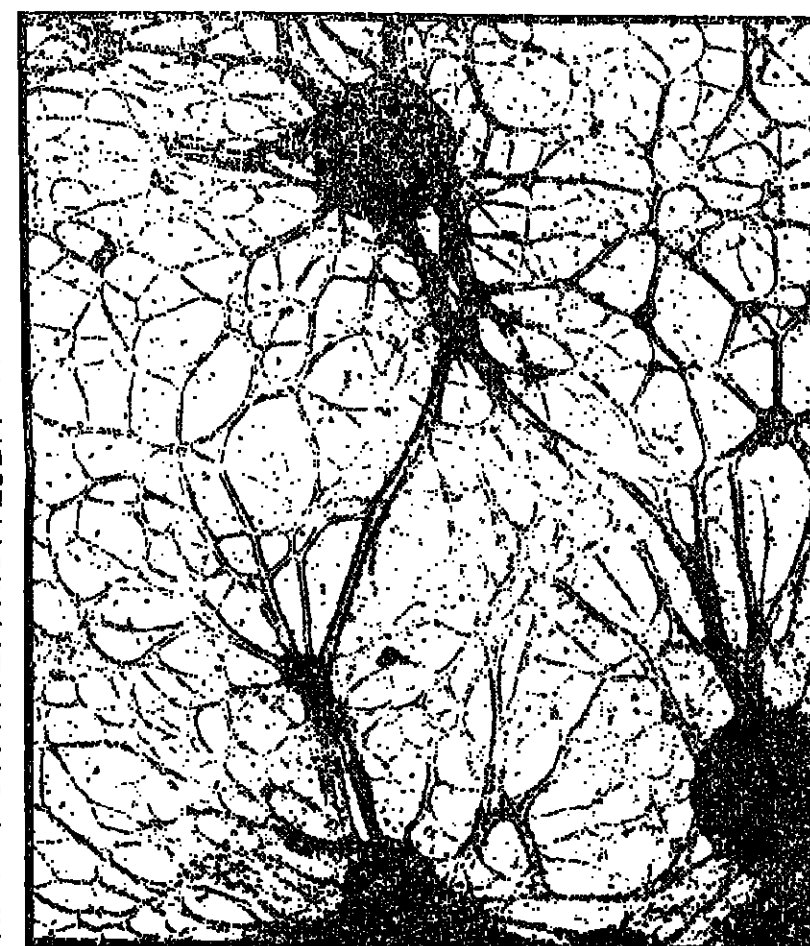
The second part of the book deals with the nature, form and function of cell components and contains chapters on the plasma membrane, the nucleus, intracellular compartments and the cytoplasmic matrix. The structural aspects of the plasma membrane concentrate on the fluid mosaic model of Singer and Nicolson and then go on to describe the role of membrane proteins in cell attachment, transport, and cell attachment. The chapter on the nucleus begins with a brief description of the prokaryotic system and the eukaryotic chromosome, and then goes on to describe the regulation of nuclear activity and gene expression in differentiating cells, the nucleus and the cytoplasmic events that occur during protein synthesis. The intracellular compartments that are included in the chapter are the endoplasmic reticulum, the vacuolar system and the mitochondrion. The final chapter is mainly concerned with microfilaments and their role in muscle contraction, cell locomotion and the cell periphery and microtubules and their function in the cytoskeleton and organelles.

Because of the manner in which the book has been written all of the topics are dealt with rather superficially but fortunately each topic is beautifully illustrated with first-class micrographs and these are described in great detail. For

example, the account of the cytoplasmic matrix contains three light micrographs demonstrating the distribution of actin and tubulin in cells by an immunocytochemical method using antibodies directed against these proteins, and there is a scanning electron micrograph illustrating the locomotion of white blood cells. Similarly a sequence of electron micrographs shows the events that occur during mitosis and a series of scanning micrographs shows cytokinesis. Cell junctions and gap junctions and scanning micrographs of normal and transformed cells are used to demonstrate contact inhibition and malignancy. There are also a number of scanning electron micrographs that have obviously been carefully chosen to illustrate a point in the text. These include a polymorphonuclear leucocyte phagocytosing a micro-organism, a developing eosinophil leucocyte stained to show the distribution of myeloperoxidase, two electron micrographs showing the incorporation of amino acid precursors into a secretory product of the pituitary, the secretory pathway of an exocrine cell outlined by staining its secretory product, the nuclear tubular cristae of the mitochondrion of cells in the adrenal cortex and 75 other quality micrographs.

This book is well worth buying even if it is only for the illustrations.

D. J. Beadle



Nerve cells in culture, magnification x 40; an illustration from Professor Hopkins's book.

Into infinity

Introduction to the Theory of Infinitesimals
by K. D. Stroyan and W. A. J. Luxemburg
Academic Press, £18.20
ISBN 0 12 574150 6

An important feature of the development of the calculus by Leibniz, which occurs only in a partially controlled form in Newton's fluxions. It is the use of infinitesimals, in Leibniz's view, "they can certainly be used as ideal concepts which shorten the argument, similar to what are known as imaginary roots in algebra". Now the trouble with this view is that, as stated in detail by Leibniz, it has inherent contradictions (two numbers which differ infinitesimally are to be identified, but not if one of them happens to be zero, and this identification has to preserve addition, which the Leibnizian condition prevents). None the less, this view was the predominant one until the second half of the nineteenth century when Weierstrass (principally) formulated a much weaker way of talking which was strong enough for the calculus, as Leibniz's view was destined to remain at the heuristic level.

In the past 20 years there has been a complete reversal of this view. In 1928 Schmieden and Borel constructed an enlarged calculus system, though one that was not that of division was no more than is known about the logical reality of the town, the harder it seems to be to explain change plausibly except in terms of the forces of change, though perfectly correct, is rather pedestrian and tautological: "Urban change consequent on economic change occurs but it was uneven and generalized in effect over the towns".

His conclusions, based as they are on historical data, tend to be cautious, negative and diffuse. There is more than is known about the logical reality of the town, the harder it seems to be to explain change plausibly except in terms of the forces of change, though perfectly correct, is rather pedestrian and tautological: "Urban change consequent on economic change occurs but it was uneven and generalized in effect over the towns".

Cambridge University Press has published at £4.50 a bibliography handbook on *The High Middle Ages in England 1154-1327* compiled by Bertie Wilkinson for the Centre for British Studies. The book covers all aspects of the period, with sections on political, economic, cultural and religious history. The series is designed to help scholars and advanced students in their studies and also serve as a basis for research.

most mathematicians who see mathematics as a rather small fragment of a rather large body of knowledge, which it is never necessary to mention types. One attempt to get around this difficulty is to use the "ultra-power" construction, and this approach is in Luxemburg's original book, but the present book is a much fuller working out of this approach.

From the advanced mathematician's point of view this is very satisfactory, since, if one regards the axiom of choice as both true and in a generalized sense constructive, the method is itself a constructive one.

In a sense rather more than is needed is being assumed; as Maddy and Hirschfeld showed in their lecture notes volume, the essential tool from logic is the compactness theorem in the first order predicate calculus (first order, rather than Robinson's original more complex formulation, because one can rewrite all that is needed in a first order language whose variables range over sets or points). And the compactness theorem does not assume the axiom of choice, but only the axiom that every non-trivial Boolean ideal of a Boolean algebra can be extended to a maximal ideal. Since this follows from the statement that the topological product of any number of copies of a discrete two-element space is compact, we are dealing with a disguised form of a special case of Tychonoff's theorem.

But the ultra-power construction has the great advantage of putting the logical considerations out of the way very quickly. The approach adopted here is to give a brief and fairly informal (though actually very carefully) introduction in which infinitesimals are introduced to the rational field by the ultra-power construction. This is used to help the mathematical reader through the next two chapters in which the logical apparatus is set up, and there are then two chapters on the foundations of the calculus (differentiation and integration). This first part would be suitable for mathematicians undergraduates, at least by their third year. The second half of the book is more specialized. Two chapters, set up more logical apparatus, and the remaining two apply this to functional analysis, particularly to compactification problems and Banach spaces.

This structure was presented by Robinson using the theory of types, which an approach is unfamiliar to

C. W. Kilmister

West African weather

The Climates of West Africa
by Oyediran Ojo
Heinemann Educational, £9.00 and £4.00
ISBN 0 435 95700 1 and 95701 5

This is the first detailed account of the climates of West Africa, and it may be said at once that it has drawn very widely on published material and put it together quite admirably.

Good and detailed chapters on radiation and temperature lead into an assessment of the factors influencing evaporation and potential transpiration, and methods of measuring or estimating these, with a brief section on the water balance.

The great seasonal and latitudinal variations of atmospheric moisture and rainfall are described in chapters four and five, and the latter chapter emphasizes how the seasonal migration and day to day variations in the position of the inter-tropical discontinuity (ITD) are fundamental to the understanding of weather and climate.

Frequencies of disturbance to the south of the ITD are given, together with particular examples and associated weather.

A chapter on regional climatic patterns applies the Köppen, Miller and Thornthwaite classifications to West Africa. Several particular climatic regions are described by Fagbemi and Okunola, Thornthwaite and Mather, Tupalakis, Ayanda,

Gannier, and Budiyat all rightly concentrate on indices of moisture adequacy. The brief section on a later chapter on the use of agro-climatic classifications might have been introduced here and expanded with further examples.

The book has a very large number of excellently produced and useful diagrams and tables and has a good bibliography. The opportunity might have been taken to introduce more material on hydro-meteorology and agro-meteorology, and to include more on the latest research in synoptic climatology. But there can be little doubt that this book is an excellent introduction to the climatology of West Africa. It will find much of value in it. Perhaps it may inspire other authors to write specialist accounts based on the vast amount of research going on in hydro and agro-meteorology and in synoptic and dynamic climatology.

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David M. Adams

Acknowledging a master

Vogel's Textbook of Quantitative Inorganic Analysis (fourth edition)
revised by J. Bassett, et al
Longman, £14.00
ISBN 0 435 95700 1 and 95701 5

Some books are just too valuable to be allowed to die out by the inevitable process of becoming dated: which is, perhaps, only another way of saying that nobody can think of a method of freshening up the treatment without plagiarising on a scale that troubles even the most elastic conscience. This form of posthumous recognition akin to canonization is now conferred on Arthur I. Vogel with the appearance of a multi-authored revision of his *Textbook of Quantitative Inorganic Analysis*, the third edition of which appeared in 1961. A link with Vogel is retained in the person of G. L. Jeffery whose contribution to the first edition in 1939 was acknowledged by Vogel.

Modernization of treatment has meant inevitably a shift of the balance between traditional (titrimetry, gravimetry and electroanalysis) and modern (spectroscopy, X-ray fluorescence, neutron activation analysis, and Raman spectroscopy) methods. They have also perpetuated a

widely-held fallacy in deleting Vogel's section on infra-red spectroscopy "in view of the limited application of this technique for quantitative inorganic analysis", a claim which is emphatically untrue in relation to the new generation of ratio-recording instruments. Indeed the "chips with everything" revolution is so rapidly reducing many complex and skill-demanding analytical procedures to push-button ease that the most modern sections of this work may date the fastest.

Despite the modern flavour of this fourth edition, the primary strengths of the work remain where they always have been: in the traditional, unglamorous, and indisputable analytical methods which must constitute the court of final appeal, even in our increasingly instrument-dominated world. The authors are to be congratulated on their work, which can only perpetuate the pre-eminence once occupied by Vogel's book among analysts and teachers of the art.

David M. Adams

Paul Dukes

Centuries

Peter Gordon and Denis Lewton

This important new book discusses the process of curriculum change in the wider context of various kinds of social, economic and political change which have had important educational consequences. From the official background of Acts, Reports and other historical landmarks, the authors turn to the major influences on the curricula of primary and secondary schools today. Six subjects are studied in detail, the interconnection between teaching methods and curriculum content explored, and the influence of examinations analysed. Finally, the extent to which various pressure groups have affected the content of education is described. Biographical notes on the major historical figures mentioned in the study are included, and there is an extensive bibliography.

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BOOKS

Contained in time past

The Composition of "Four Quartets" by Helen Gardner
Faber, £9.50
ISBN 0 571 11048 7

This is a book to place alongside Valerie Eliot's edition of the drafts of *The Waste Land*, and E. Martin Browne's *The Making of T. S. Eliot's Poems*. In its method, as in its materials, it is a different sort of book from theirs; but it is like theirs, in making generally available material which will remain of permanent interest.

There is little evidence about the composition of *Burnt Norton*. The one known draft is the typescript sent to the printer of *Collected Poems* 1909-1935, and this shows only some last-minute adjustments. Eliot said the poem originated "with bits that had to be cut out of *Murder in the Cathedral*". Helen Gardner is able to give just the nine lines which became the opening 14 lines of the poem. But surely much more than that must have derived from the poem: the relationship is intimate and complete, and it is surprising that it has yet to be adequately explored. Helen Gardner attends rather to the person and the place in the background; and her account of the garden and landscape of *Burnt Norton*, and of Eliot's visit to it with Emily Hale in the summer of 1934, adds many details and fresh observations to what was formerly known. What is needed now, if we would understand the composition of the poem, is an account of how these and the other materials combined in Eliot's mind, and of how they were shaped and altered in its making. I think it very likely that it was the immediately personal experience which made the vital difference between the poem and the commissioned play. Yet that does

not explain how Eliot managed to find his perfect form in it at last. His previous longer poems, including *The Waste Land* and *Ash-Wednesday*, had been sequences; could it have been the writing of *Murder in the Cathedral* that led to the discovery of his wholly unified "quartet" form?

Not until the war—early in 1940, apparently—did Eliot conceive the idea of the set of Quartets. *East Coker* and *The Dry Salvages* were completed in little more than a year; but *Little Gidding* proved more difficult, and was not published until October, 1942. Just three years to write the three of them: when one thinks of the decade needed to bring *The Waste Land* to birth, and the gradual composition over several years of the other sequences, then the speed and sureness with which these wartime Quartets were written appears quite extraordinary. Eliot was no longer being harried by his furies, nor was he wrestling to bring them into conformity with his "higher dream". He had found the controlling form for his lifetime's experience and knew precisely what he had to say and how it should be shaped. His art had become so conscious that he had to tell himself that *Little Gidding* needed "some sharpening of language"; some acute personal reminiscence... to give power from below the surface". But the attempt to draw upon personal experience proved a false step—the only significant one in the whole work. The "essential moments" which had been the primary resource of his earlier poetry, had become a lifeless catalogue, now that their meaning was wholly understood.

The successive typed drafts of the wartime Quartets have been preserved, and also—these being the most interesting—some graph notes and first drafts. Helen

Gardner has presented this considerable body of material compactly and effectively, rather after the manner of the Oxford English Texts. She prints the 1944 text of *Four Quartets* with an apparatus of the various readings of the drafts and the main printed editions, and with an accompanying commentary. (The background of Eliot's personal circumstances in the years 1932-44, and of some of the literary and other sources, is given in the introductory chapters.) Nothing of importance in the drafts has been omitted; and the commentary includes generous extracts from Eliot's correspondence with his critical and admiring friend John Hayward.

My grateful sense that a difficult and worthwhile task has been excellently performed is qualified, first by the wish that there should have been some facsimiles, at least of the holograph notes and drafts; and then by the existence of a few corrigenda, all in the holograph material, which assume importance because the reader is left wholly dependent upon the accuracy of the transcription. There are perhaps a dozen misreadings or misprints, of the order of "and" for "in", "union" for "unison", "soul" for "the soul", "then" for "and", "now", "three" for "these". There are just two other lapses which should be noticed. In the commentary and the critical apparatus to *Burnt Norton* there is some confusion and inaccuracy, arising from the use of a reprint of *Collected Poems* 1909-1935 without checking it against the original edition: the text was silently altered after 1944. At the end of the typescript of *Burnt Norton* there are two cancelled lines—one is the word "Light", the other is illegible—but there is no mention of them here.

A. D. Moody



An illustration from Art: African American by Samuel La Lawrence (Harcourt Brace Jovanovich, 1975).

A question of royalties

Writer and Public in France: from the Middle Ages to the present day by John Lough
Clarendon Press: Oxford University Press, £15.00
ISBN 0 19 815749 5

There are a number of things which they do not order better in France. Motorways are expensive and inadequate, public lavatories appalling or non-existent, and the treatment of the writer, when compared to what happens in this side of the Channel, surprisingly churlish and ungenerous.

In the eighteenth century, one of the reasons for which Hume advised Rousseau to live in England was the more substantial royalties paid to authors. The most influential of all eighteenth-century French writers received only the very modest sum of 2,160 livres for his best-seller, *La Nouvelle Héloïse*. In the nineteenth century, Balzac and Gautier took what was, even by the standards of the time, a very good deal. Dickens and Thackeray, while early in the twentieth, Gide recorded with some awe the fortune which Arnold Bennett was able to acquire from his novels.

In the twentieth century of course the greater affluence of the English writer is not difficult to explain. One of the most fascinating long-term effects of the French withdrawal from India and Canada in the 1760s has been the enormous greater potential audience available to the English writer compared to his French counterpart. Moreover the statistics which Professor Lough quotes about loans from public libraries also suggest that the emphy, felt by so many

writers for public libraries in this country may be somewhat misplaced. For while libraries in Great Britain lend out 9.4 books annually to each inhabitant, in France the figure is 0.7. And while the United Kingdom libraries lend 125 pence a year a head of population, in France the sum is as low as 0.65 francs.

Neither do the facts and figures adduced by Lough in the earlier chapters of this fascinating and fascinating book support the view that French authors in earlier centuries derived a great deal of profit and prestige from the official support which the State provided for literature and the arts. It is almost certain that the reason why Racine gave up writing tragedies at the age of 36, when he was at the very height of his powers, was that he had been appointed to the much more prestigious and lucrative post of royal historiographer; while the more general inadequacies of royal protection are summed up in the fact that both he and Boileau were for a time in serious danger of being beaten up—as Voltaire actually was in the next century—by the hired thugs of offended noblemen.

There are of course exceptions to this general tale of woe. Zola, for all his misery, made a very handsome living, as did also Daudet and Victor Hugo. Camus and Sartre do not figure in Lough's index, but the fact that *L'Étranger* and *La Nausée* have sold well over one million copies each in paperback editions is an indication that their dependants are unlikely to be short of a bob or two.

Writers are like actors: there are always too many of them for the demand available. But unlike

actors, writers can always combine their artistic creativity with a more humdrum job. In France, they have been clerics, librarians, civil servants, teachers, ambassadors and historians. Just as T. S. Eliot had been a bank clerk, Paul Valéry a body and mind officially together by working at the publicity agency of Havas. Some of the more fortunate, like Gautier, collected profitable securities, while the less fortunate, like Lamartine, wrote pot-pourris until eventually rescued by a tardily magnificent state.

But few died of hunger, and the predominant impression left by Lough's study is that those who take up the pen in France are, like Kipling's mariner, endowed with infinite resource and sagacity. Lived by a censorship which did not really disappear until 1881, exploited by publishers, snubbed by the aristocracy, ignored by the vast majority of the population, they have nevertheless produced a literature of variety and originality.

John Lough officially retires this year from a university to which he has brought distinction and learning for some twenty years. To say that his latest book is up to the standard of his earlier studies of French culture in the seventeenth, eighteenth and nineteenth centuries is, for those who have derived profit and pleasure from his over the years, sufficient guarantee of excellence. He has provided the indispensable adjunct to the histories of literature which concentrate on the qualities of the finished product. What he shows us is how those who wrote the books earned their living.

Philip Thoday

Double sorrow

The Genre of Tragicomic and Comedy by Monica R. McAlpine
Cornell University Press, £8.75
ISBN 0 8014 0962 4

What could be tragic to the Ages of Faith? The strongest awareness of a tragic dimension to human life often appears in medieval texts not defining themselves as tragedies, but medieval "tragedies" have usually been restricted to the exemplary fall from high to low estate.

To Miss McAlpine, the description of *Trilogies* as a tragedy is an ironic reflection on its narrator, ignorant of the deeply anti-tragic view of experience offered by Boethius. *Trilogies* becomes Chaucer's critique of tragedy as an approach to life. The very fullness of his characterization comments on the disappointed potential of worldly life, which the anti-tragic optimism of the here's final comedy transcends. It is Criseyde who is the tragic figure of the poem.

It is right to trace the poem's constantly developing, piecemeal perception to Chaucer's response to Boethius, but the nature of medieval tragedy has been unduly deprecatized. Existing aids to devout reflection, medieval tragedies do not show an inadequate tragic sense, representing tragedy only in material terms of loss of power and possessions. The medieval reader knows how the worldly limitations each tragedy demonstrates make a larger spiritual point about earthly experience. It is in this sense, not ironically, that Chaucer's *Trilogies* describes itself as tragic. McAlpine also underestimates the medieval association of love with the tragic. Instead of parodying in *Trilogies* Boethius's tragedies of the

falls of great men, it is more likely Chaucer takes over the example of Boethius's own tragic and philosophical romances. The poem shows the tragic frustration of the most powerful human emotions. The fates of Tristram and Lancelot seem the soul with the sense of the sense both of the utterance of human love and in life. At the story of Tristram, damned but lovely in hell, Dante swears for grief.

What the medieval tragic sense may lack in terror, it more than makes up by the intensity of its pity, which can create such confidence in man's world. Chaucer's sense of the tragic expresses itself through the poem of weakness. McAlpine uses a fine choice, more in keeping with the secular tragedy, and exaggerates Criseyde's role by a modern humanist view. But it is the helplessness of his characters that recurrently concerns Chaucer's poems.

The interesting book reflects the difficulties of understanding the poet's achievement. Chaucer always has a last laugh on us, for his poem promotes a state of thoughtful reflection that sees the fullness of his interpretations. Of his double-edged art, he said as the *Trilogies* people's ideas about Jesus: "One in his great virtue is plain as a windblown sleeve. He falls no place and clings whither he may try him, as he is bound to be. He is at the back of every best for honest deeds or fraud. He is deadly earnest or a game. He is just as you would have him."

Barry Windeatt

Narrative patterns

Shakespeare and the Story: aspects of creative narrative by Joan Rees
Athlone Press, 1975
ISBN 0 485 11179 9

This book is not a source study but an exploration of Shakespeare's story-telling technique viewed in a variety of different ways.

Dr Rees begins by discussing a group of comedies whose narrative seems to have caused Shakespeare particular problems (*After a while, Venice, Much Ado, All's Well and Measure for Measure*). She goes on to a pair which lack narrative almost entirely (*As You Like It* and *Twelfth Night*) and then tackles a group of plays where historical fact restricts the narrative (the English and classical histories). Then a group which provide variations on one basic narrative pattern (crime and its consequences in revenge, retribution or reconciliation in *Richard III, Macbeth, Cymbeline, Winter's Tale* and *Tempest*). Finally there are individual chapters on *Hamlet* and *Lea*.

The approach is defiantly anti-intellectual: Dr Rees goes her return to narrative and her hero of discussing Shakespeare's creative processes in the light of it as an alternative to recent critical approaches which she says "deadens the plays by imposing upon them schemes of ideas which effectively smother the breathing life that is in them."

She is against over-interpretation which reveals itself in the use of "intellectual formulas" and an "overlay of themes and ideas". In the present climate of literary opinion, she can also inter that she is against structuralism, which she completely ignores interesting recent work on narrative structures which would have been relevant to her argument. Even more surprisingly, she takes no account of work by scholars such as Enkvist, Jones (*Scenic Form in Shakespeare*) and Mark Rose (*Shakespearean Design*) when she gets down to discussing scenic structure in such pairs of plays as *Measure for Measure* and *Henry IV* and *Antony and Cleopatra*.

The subtitle, "Aspects of Creation," turns out in fact to be rather misleading: I found some confusion in the book between the process of artistic creation and the

process of literary criticism. Rees opens with a classic anti-artistic opposition by quoting E. Price and D. H. Lawrence. She then tells us that "Shakespeare's work is a strict logical construction developed from point to point until he brings to the necessary and inevitable conclusion," whereas Lawrence says "The Work of Creation, begins with a work which is not in his mind, it could never have thought in before it happened."

This juxtaposition of Price and Lawrence is somewhat odd. (Rees might at least have quoted on the "intellectual composition" side of the argument) but it soon becomes apparent that the author has set herself an impossible task when she goes on to prove that "Shakespeare was an important event, Lawrence rather than Price." The conclusion arises because they are in many chapters, able as they are in many ways, do not, and cannot, have much to do with Shakespeare's creative processes. Any such analysis must after all be entirely arbitrary, and this one is a reader's viewpoint projected back onto the author.

This is given away, for example, by the author's repeated use of the qualified assumption that Shakespeare worked on his narrative in the order in which we find it, that is from the beginning of *Act I*. The chapters are presented in a particular way which works on the story until it "runs its course", at which point he has a look around for new material to develop. This seems a naive way of looking at composition to apply to any writer, let alone to Shakespeare, whom we suspect, on the two plays of *Timon* and *The Two Gentlemen*, to have worked on his materials in a climactic sequence, filling in earlier episodes.

Altogether, I found the argument, filling in earlier episodes, a little tedious. Ironically, the counterproductive framework, Rees has smothered her own thoughtful and sensitive readings of the plays with an overlay of acceptable theory.

Ann Thompson

BOOKS

Highlighting Poland's centuries of greatness

A History of Poland by A. Halecki
Updated by Antony Polonsky
Routledge & Kegan Paul, £7.50
ISBN 0 7100 8647 4

This classic history of Poland was written by a liberal nationalist who represented his country at Versailles, served for a time on the League of Nations secretariat, and later held academic posts in several countries. He ended his life as an exile in the American university world.

It is imbued with the romantic nationalism which inspired the generation of Versailles and which saw the rebirth of nations which for centuries had lain under the control of the great empires. In Poland's case the period of total submergence was little more than a century, and the foreign occupiers were the Hohenzollerns, the Romanovs and the Habsburgs.

Professor Halecki plays down these years from partition to rebirth, and looks back to the early history of the state. He begins with the conversion of Mieszko I to Christianity and the effect this had in drawing Poland closer to western Christendom, and to the later identification of Polish nationalism with Roman Catholicism—a fact of great significance today. Halecki's blood thrills to the memory of the great days of

Boleslaus the Great, Casimir, Jodwig and even of Sobieski, when Poland made its mark in European history.

Most of the new nations which emerged in nineteenth and early twentieth-century eastern Europe could look back to a time of medieval greatness, when their frontiers extended far beyond the present confines. Poland under the Piasts and the Jagiellonians reached out to, and eventually achieved for a time, a foothold on the Black Sea and a longer frontage on the Baltic shore. The more extreme nationalists in prewar Poland seemed to regard these "historic" frontiers as an essential feature of the newly born state's patrimony. Halecki, while not overtly stating so extreme a view, does consciously pay disproportionate attention to "the centuries of Poland's greatness" that is, from the accession of Jodwig of Anjou in 1384 to the death of Sigismund Augustus in 1572.

It has been said that a nation is a group of people united by a common error as to their origins and a common dislike of their neighbours. The need for historic roots is deeply felt in new or newly reconstructed nations such as Poland was between the wars. A sense of grievance against one's neighbours can also be useful in helping to create a sense of national unity.

There have always been historians who have always been historians who will support the national aspira-

tions of the leaders. When other springs of political inspiration have run dry, it is always possible to dip deep into the wells of nationalism to assuage the thirst of the masses. Ceausescu today in Romania, Gomulka in the 1960s, Stalin during the Second World War, Hitler in the 1930s, Pilsudski in the 1920s—all have played the nationalist card and have found that there have always been tame scholars on hand to provide an air of intellectual verisimilitude to an otherwise improbable tale.

Halecki was not a fabulist of history. He was a liberal nationalist whose nationalism got the better of his liberalism when he came to deal with Poland's relations with its neighbours. His most severe criticism of the Colonel's regime is of Sulejowski's conviction of Telen (Cieszyński) from Czechoslovakia (a most regrettable step" writes Halecki) though perhaps he ought to have said *c'est une vraie crime, c'est une faute*. He is less than fair to the Lithuanians over Vilno, describing its seizure, along with parts of the Ukraine and Belorussia as "the most glorious page in the history of the rebuffing of the republic". He says nothing about the rights of the Lithuanians, or their treatment at the hands of the Poles, merely chiding them for trusting the Russians. No wonder the Lithuanians cried out *Mex Hic Vilno ne norimam!* Without Vilno we will not be happy."

The failure of successive governments to do anything to alleviate the position of the 5,000,000 Ukrainians and Belorussians in Eastern Poland is glossed over, and the refusal to do anything to remove discrimination against the 10 per cent of the population who were Jews merits only a passing remark: "The rise of an anti-Semitic movement on economic, rather than on racial grounds, was unfortunately almost inevitable."

Halecki's story finishes with Poland's accession to the Warsaw Pact in 1955. Dr Antony Polonsky has added chapters on "The Rise and Fall of Gomulka" and on "Poland under Giermek", which bring us to 1977. They are well written and fair minded, but they cannot make up for the weaknesses of the original. A good modern one-volume history of Poland is still needed. It is to be hoped that it will contain some objective study of Poland's relations with her neighbours. The sad fact of Poland's geographical situation, wedged between expansionist Germans and Russians, and in earlier times beset by invaders from the Baltic, and from the south by Magyars and by Habsburgs, is well summed up in the very joke of 1956: "Advertiser willing to exchange practically unused sovereignty for superior geographical position. Apply W. Gomulka."

F. B. Singleton

In the service of Russia

Nicholas I: Emperor and autocrat of all the Russias by W. Bruce Lincoln
Allen Lane, £10.00
ISBN 0 7139 0837 8

"Hurrah! Hurrah! Imperikal is dead!" the boys of London shouted in February, 1855, excited no doubt by a youthful jingoism but also encouraged by the silver coins of Alexander Herzen. Another black tyrant had fallen from his autocratic throne, and the enemy of nearly all Europe had been weakened at a critical moment of the Crimean War. Now it seemed certain that the Russians would not have Constantinople.

As W. Bruce Lincoln reminds us in his biography, Nicholas never did want Constantinople, and as a monarch generally, the man has been much misunderstood. This was not always the case. As late as 1853, Palmerston said that "the Emperor of Russia is ambitious and grasping, but he is a gentleman", and after he visited her in 1844, Queen Victoria wrote "He is stern and severe, but without pride or egotism, and with nothing on earth will make him change." Her emphasis would have been his own: "Serve Russia" was his last instruction to his son, and he believed that he himself had tried throughout his reign to carry out such an injunction. But the simple command could not always easily be

brought into effect; the bureaucracy was already a byword for cumbersome inaction. In 1850 the Ministry of the Interior estimated that it was responsible for more than 30 million communications, over half of them sent into the central administration from made-up numbers of provincial offices at its own request.

If he could not bring about much reform, and the extent to which he wished to do so was in any case not great, Nicholas did come near to realizing peace and stability for much of his thirty years, no mean achievement for a monarch whose reign had begun with a civil war, and who had to deal with a regime of dissident nobles, the Decembrist Revolt. To succeed he needed the constant support of the

class from which the Decembrists had sprung, and all threats of disaffection from whatever quarter were vigorously pursued by the secret police of the notorious Third Section of his Chancery.

While Nicholas may not have been the most attractive of monarchs, there is no doubt that his reign was one of considerable significance, whether viewed as the apogee of absolutism or its nadir. It is surprising that no competent biography has appeared in English before, and now that Lincoln has done such a good job with the primary and secondary sources, it is unlikely that this one will be easily superseded.

Paul Dukes

Life in Wales

Attitudes and Second Homes in Rural Wales by Chris Holom
£2.50 is number 3 in the Social Science Monograph series published by the University of Wales. In a study of five communities the author attempts to define how the villagers' lives are affected by the practice of second home buying within their communities.

Number 4 in the series is *After the Mines* by Stephen W. Town (£2.50) and is a study of changing employment opportunities in the Amman Valley. Its main purpose is to discover what attitudes towards employment and social organization are prevalent in a community which has been solely dependent on mining for its livelihood and identity.

Opposition to Franco

Dictatorship and Political Dissent: studies and students in Franco's Spain by José Maravall
Penguin, £7.95
ISBN 0 442 76160 5

José Maravall's twin themes, which spring from two separate but complementary pieces of research, are working-class dissent and student opposition to the only recently overthrown Spanish dictatorship of General Franco. In exploring them the author presents us with two contrasting case studies of opposition within the context of an authoritarian regime. Equally, he makes a useful contribution to more general thinking about the dynamics of opposition movements within non-democratic polities.

On the left wing of Spanish politics there has been controversy about the precise source of the renewed working class dissent. Socialist militants and trade unionists have tended to emphasise an underlying continuity between working-class politics of the civil war epoch and more recent developments. Their communist counterparts, however, have been more inclined to emphasize the element of discontinuity introduced by the emergence of new generations and relatively recent changes in the structure of Spanish society. The debate is linked with communist efforts to take over leadership of the Spanish working-class movement from the traditionally stronger socialist, and to divisions over opposition strategy. The socialist union, the UGT, insisted upon legal and underground struggle throughout the post-civil war period, while the communists became more willing to operate at two levels. They progressed a secret underground organization but also espoused a policy of infiltrating and exploiting official union structures. Through the workers' committees, which developed in the 1960s, they sought to exercise more open and widespread influence among Spanish workers and more readily

accepted the compromises or ambiguities inherent in such a position.

In approaching these debates the author retains an appropriate degree of objectivity. He writes with obvious sympathy for the general working-class movement, but never becomes the mouthpiece for a single partisan cause. Thus, with the aid of a substantial body of evidence, he judiciously evaluates the competing strategies and the distinctive contributions to the general cause, of differing unions and parties.

As Maravall makes plain it is the operations of illegal opposition political parties that provides the link between working-class and student opposition to Franco's regime. In view of this, more attention should perhaps have been paid to the subject of these parties. This is especially true in view of the way in which, on the author's own admission, political parties came to exercise an increasingly open influence on the course of student politics. Nevertheless, Maravall's work and in particular the material provided by interviews with student activists, makes his own study a significant contribution to our understanding of the genesis of student opposition in an authoritarian political system.

Of particular interest is an analysis of those who gave the student movement its initial impetus. The analysis, together with evidence about the origins of working-class dissidents, offers an insight into the conditions that may be needed for successfully nurturing opposition to an authoritarian state.

K. N. Medhurst

Curriculum Change in the Nineteenth & Twentieth Centuries

Peter Gordon and Denis Lawton

This important new book discusses the process of curriculum change in the wider context of various kinds of social, economic and political change which have had important educational consequences. From the official background of Acts, Reports and other historical landmarks, the authors turn to the major influences on the curricula of primary and secondary schools today. Six subjects are studied in detail, the interconnection between teaching methods and curriculum content explored, and the influence of examinations analysed. Finally, the extent to which various pressure groups have affected the content of education is described. Biographical notes on the major historical figures mentioned in the study are included, and there is an extensive bibliography.

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Colleges and Institutes of Higher Education
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Librarians
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Applications are invited for the following posts, for which applications close on the dates shown. SALARIES (unless otherwise stated) are as follows:
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SENIOR LECTURER/LECTURER IN ITALIAN (TENURABLE)
The appointee will be expected to participate in the development and teaching of courses in Italian language, literature and general culture, but the primary responsibility will be in the area of literature. Candidates should have a higher degree, teaching experience and be able to teach in both English and Italian. To September, 1978.

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Applications are invited for this position. The successful candidate will be expected to participate in the first-year teaching programme in Botany. A strong commitment to research is essential and there will be opportunities to supervise students for higher degrees. To August, 1978.

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Applications are invited for appointment to the position of Registrar of the University which will become vacant on the retirement of the present Registrar, Mr D. A. Kearney. The successful candidate will have extensive experience in educational administration, preferably in a university. Salary \$21,730. To August, 1978.

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Applications are invited for two lectureships in the Department of Sociology. Preference will be given to applicants holding PhD degrees and having research experience in Australian society. To August, 1978.

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Faculty of Economics and Politics. The position is at professional level. The duties of the Centre include: (i) the encouragement of research in policy analysis including research on the frontiers of economics, politics and other disciplines; (ii) the attracting of

outside researchers including post-doctoral fellows and visiting scholars for short-term periods; (iii) the attracting of funds for policy oriented research both for specific purposes and to facilitate the continuity of the Centre; (iv) the extension of the range and quality of research and analysis by organizing workshops, seminars and conferences and assisting in the work of graduate students on subjects of policy interest. While other appointments to the Centre will be made dependent upon outside funds, many members of the Faculty of Economics and Politics and other staff are engaged in the studies of policy, importance and will provide a base for the development of the Centre. To August, 1978.

Australian National University
RESEARCH FELLOW/SENIOR RESEARCH FELLOW: DEPARTMENT OF INTERNATIONAL RELATIONS
Research School of Pacific Studies. The Head of the Department is Professor J. H. Muller. The position is at professional level. The duties of the Centre include: (i) the encouragement of research in policy analysis including research on the frontiers of economics, politics and other disciplines; (ii) the attracting of

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Faculty of Arts. The successful applicant should be a native speaker of German and competent in English. He should hold a PhD degree, preferably from a university, and have teaching experience. He should be interested in one or more of the following fields: German literature, German history, German culture, German language and linguistics. To September, 1978.

KATHOLIEKE UNIVERSITEIT NIJMEGEN

full professor philosophical anthropology

Applications are invited for the above post from candidates who have shown professional excellence in the field of philosophical anthropology. They must also have a thorough acquaintance with empirical psychology and with the problems of philosophy of science with reference to the social sciences. Tasks will consist in lectures and seminars for undergraduate and graduate students in philosophy and psychology; the supervision of theses, and research work in the areas of organisation and administration. Foreigners will be asked to acquire fluency in Dutch within two years of appointment. Salary scale according to government regulations. Applications and letters of recommendation to be sent to Prof. Dr. D. F. Scholten, Chairperson Appointments Committee, Filosofisch Instituut, Erasmuslaan 40, 6525 EX Nijmegen, within six weeks.

the netherlands

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Applications for further particulars of the post and information on pension, medical aid, group insurance, club benefits, housing and other facilities are obtainable from the Registrar, University of Natal, King George V Avenue, Durban, with whom applications on the prescribed form, must be lodged not later than 14th August, 1978, quoting the reference Adv. D 32/78.

THE UNIVERSITY OF SHEFFIELD

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Lecturer in Economics and Industrial Studies to be responsible for Hurst House Adult Education Centre, Chesterfield
Applications are invited from men and women graduates in Economics to teach mainly day release courses for trade unionists. The successful candidate will also be responsible for the administration of the Hurst House Adult Education Centre and in conjunction with the Workers' Educational Association Tutor Centre programme. Initial salary is £2000 plus 15% per annum. On a scale of £2000 to £2500 a year, plus superannuation. Particulars on the prescribed form, must be lodged not later than 7 August, 1978. Closing date: 7 August, 1978. (Please quote Ref. 78/785).

UNIVERSITY OF JOS NIGERIA

Applications are invited for the post of PROFESSOR and HEAD of the DEPARTMENT OF PHYSICS. The successful candidate will be expected to be of high academic standing, to have published widely in his field, and to have demonstrated ability to encourage and organize research teams. Conditions of Service include assistance with travel and removal expenses and assistance to buy or build a home. Superannuation will be on the FSSU pattern, but members of the N.W. Superannuation Scheme may continue in that scheme if they wish. Study Leave is available and credit may be given for existing entitlements. Salary: N331,381 p.a. Internal inquiries should be directed in the first instance to Professor Lee, Head of the Department of Geography. Applications should include full details of qualifications, experience, research interests and publications and the names and addresses of three referees, and should be sent to the Staff Officer, University of New England, Armidale, NSW 2351, Australia, from whom further particulars can be obtained. Closing date for applications is 15 September, 1978.

UNIVERSITY OF CALABAR NIGERIA

Applications are invited for the post of DIRECTOR OF WORKS. Candidates must be graduates in Civil Engineering or equivalent and have a minimum of 10 years' experience in the design and supervision of civil works. They must have held positions of responsibility in the past. The successful candidate will be expected to assume duty as soon as possible, but not later than 1st February, 1979.

UNIVERSITY OF NEW ENGLAND

New South Wales

Lectureship

Department of Sociology. Applicants should have a PhD in Sociology and teaching and research experience in the discipline. More than one specialization is desirable and whilst welcome applications from those combining Sociology of Health and Medicine, or of Social Welfare and Social Policy are also welcome, the Department would be interested in applications from those with other fields of interest in Sociology. Salary Range, \$A15,178 to \$19,840. Closing date for applications, September 15, 1978. Applicants are asked to include in their applications examples of their publications or other written work together with course outlines, naming texts used, for any courses they have previously taught. Appointment will be made to the permanent staff but the University reserves the right to make these appointments on a probationary where it considers this appropriate. Conditions include assistance with travel and removal expenses. In addition, superannuation is available and assistance in buying or building a home. Study leave is available and credit may be granted for existing entitlements. Applications should include full details of qualifications, experience, research interests and publications and the names and addresses of three referees and should be sent to the Staff Officer, University of New England, Armidale, NSW 2351, Australia. Applications in the United Kingdom, Europe and America should forward an additional copy of application to the Secretary General, Association of Commonwealth Universities (App.), 38 Gordon Square, London WC1H 0PF, from whom further information can be obtained.

UNIVERSITY OF NEW ENGLAND

New South Wales

Professor of Geography

The University of New England wishes to fill the vacancy created by the resignation of Professor Ian Douglas. The Department of Geography has two chairs on establishment. The other chair is occupied by Professor D. A. M. Lee. The new Professor of Physical Geography will be expected to provide academic leadership generally in the Department and particularly in the areas of physical geography, environmental planning and resource management. Undergraduate and postgraduate teaching and research supervision in the Department are undertaken in the areas of physical geography, environmental planning and resource management, in some cases jointly with the School of Natural Resources. Applicants will be expected to be of high academic standing, to have published widely in their field, and to have demonstrated ability to encourage and organize research teams. Conditions of Service include assistance with travel and removal expenses and assistance to buy or build a home. Superannuation will be on the FSSU pattern, but members of the N.W. Superannuation Scheme may continue in that scheme if they wish. Study Leave is available and credit may be given for existing entitlements. Salary: N331,381 p.a. Internal inquiries should be directed in the first instance to Professor Lee, Head of the Department of Geography. Applications should include full details of qualifications, experience, research interests and publications and the names and addresses of three referees, and should be sent to the Staff Officer, University of New England, Armidale, NSW 2351, Australia, from whom further particulars can be obtained. Closing date for applications is 15 September, 1978.

UNIVERSITY OF NATAL, PIETERMARITZBURG SOUTH AFRICA

Applications are invited from suitably qualified persons for appointment to the posts of:
(a) PROFESSOR AND HEAD OF DEPARTMENT OF BUSINESS ADMINISTRATION (ref: PMB 25/78)
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The salary scale attached to the posts is: R11,250 + 450-12,000 + 600-113,800, plus 15% pensionable allowance per annum. The commencing salary will be dependent on the qualifications and experience of the successful applicant. In addition, an annual vacation savings bonus is payable, subject to Treasury regulations. The policy of the University is that all persons, regardless of sex, religion, race, colour or national origin, are eligible for appointment. Applications for further particulars of the post and information on pension, medical aid, staff benefits, housing and other facilities are obtainable from the Registrar, University of Natal, P.O. Box 375, Pietermaritzburg, 3200, with whom applications on the prescribed form, must be lodged not later than August 31, 1978, quoting the relevant reference number.

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UNIVERSITY OF NATAL, PIETERMARITZBURG SOUTH AFRICA

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(a) PROFESSOR AND HEAD OF DEPARTMENT OF BUSINESS ADMINISTRATION (ref: PMB 25/78)
(b) PROFESSOR AND HEAD OF DEPARTMENT OF ECONOMICS (ref: PMB 26/78)

The salary scale attached to the posts is: R11,250 + 450-12,000 + 600-113,800, plus 15% pensionable allowance per annum. The commencing salary will be dependent on the qualifications and experience of the successful applicant. In addition, an annual vacation savings bonus is payable, subject to Treasury regulations. The policy of the University is that all persons, regardless of sex, religion, race, colour or national origin, are eligible for appointment. Applications for further particulars of the post and information on pension, medical aid, staff benefits, housing and other facilities are obtainable from the Registrar, University of Natal, P.O. Box 375, Pietermaritzburg, 3200, with whom applications on the prescribed form, must be lodged not later than August 31, 1978, quoting the relevant reference number.

UNIVERSITY OF CAPE TOWN

Applications are invited for the following posts:
SENIOR LECTURER IN COMPUTER SCIENCE
This post, which falls vacant on the retirement of Mr. J. H. van der Merwe, is for a senior lecturer in computer science. The successful candidate will be expected to participate in the first-year teaching programme in computer science. A strong commitment to research is essential and there will be opportunities to supervise students for higher degrees. To August, 1978.

LECTURER IN CLASSICS
This post is currently vacant. The successful candidate will be expected to participate in the first-year teaching programme in Classics. A strong commitment to research is essential and there will be opportunities to supervise students for higher degrees. To August, 1978.

SENIOR LECTURER/LECTURER IN ENGLISH
This post falls vacant on the retirement of Mr. J. H. van der Merwe. The successful candidate will be expected to participate in the first-year teaching programme in English. A strong commitment to research is essential and there will be opportunities to supervise students for higher degrees. To August, 1978.

GRADUATE ADMINISTRATIVE ASSISTANT
Applications are invited for the post of Graduate Administrative Assistant in the Department of Educational Studies. The successful candidate will be expected to assist in the administration of the department. To August, 1978.

ASSISTANT ACCOUNTANT
Applications are invited for the post of Assistant Accountant in the Department of Accounting. The successful candidate will be expected to assist in the administration of the department. To August, 1978.

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Polytechnics continued

ULSTER COLLEGE

THE NORTHERN IRELAND POLYTECHNIC

RESEARCH OFFICERS

(Two year appointments only)
Salary Scale: £3,996-£4,215 (under review)

FACULTY OF BUSINESS ADMINISTRATION

The Research Officer will be responsible to the Dean and will be expected to assist academic staff in such research projects as may be determined from time to time. Candidates should have a good Honours Degree in Business Studies or Economics and possess research, industrial or professional experience.

FACULTY OF SCIENCE

School of Life Sciences

A Research Officer is required to assist initially with an investigation into the structure of coarse fish populations in Lough Erne, County Fermanagh. The area of investigation will depend on the qualifications and experience of the successful candidate. Applicants should have a good honours degree in Biology, postgraduate experience in research and a driver's licence.

School of Environmental Sciences

A Research Officer is required in the Geology Section of the School of Environmental Sciences to co-ordinate and promote research in applied areas of geological investigation. Applicants should have a good honours degree in Geology and research experience preferably at a doctoral level.

School of Physical Science

1. A Research Officer is required to assist a group working on the synthesis and characterisation of polymers. Applicants must have a good honours degree or equivalent in Chemistry and should have relevant research or industrial experience. Postgraduate qualifications would be an added advantage.
2. The person appointed will be involved in a research project into the upper atmosphere and will be expected to take part in field work involving an eight week period in the Arctic during Winter. Applicants should have a good Honours degree in Physics, Physical Science or Electronics and at least two years postgraduate research experience preferably in optics or theoretical physics. The project is grant-aided by the Science Research Council.

FACULTY OF SOCIAL AND HEALTH SCIENCES

Applications are invited for this full-time appointment from persons qualified at graduate and postgraduate level in the Social Sciences or Psychology. Applicants should have substantial experience of individual and group research. The person appointed will offer assistance with a wide range of projects in the Faculty of Social and Health Sciences.

RESEARCH ASSISTANT

(Two year appointment only)

FACULTY OF TECHNOLOGY

School of Civil Engineering

Salary Scale: £2,984-£3,321 (under review)

Applications are invited from persons holding HND or BSC, preferably in Civil Engineering, for work on physical and computer modelling of river systems. Previous research experience is desirable but not essential. The Polytechnic is a direct grant institution with an independent Board of Governors. It opened in 1971 and now has a student population of some 7,100. It has extensive new purpose-built accommodation, including 750 residential places on the 114 acre campus overlooking the sea at Jordanstown, a pleasant and quiet residential area. There is a scheme of assistance with removal.

Further particulars and application forms, which must be returned by Aug 3, may be obtained by telephoning Whiteabbey (0231) 65111 ext. 2243 or by writing to: The Establishment Officer, Ulster College, The Northern Ireland Polytechnic, Shore Road, Newtownabbey, Co. Antrim BT37 0QB.

BRISTOL

THE POLYTECHNIC

DEPARTMENT OF DESIGN

GRADE II SENIOR LECTURER

Applications are invited from persons holding a BSc or BArch for the above post in the School of Design.

The successful applicant will be expected to make a creative contribution to the design of the School of Design.

Further particulars and application forms, which must be returned by Aug 3, may be obtained by telephoning Whiteabbey (0231) 65111 ext. 2243 or by writing to: The Establishment Officer, Ulster College, The Northern Ireland Polytechnic, Shore Road, Newtownabbey, Co. Antrim BT37 0QB.

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NORTH STAFFORDSHIRE POLYTECHNIC

Department of Humanities

Lecturer I/Lecturer II in
ENGLISH LITERATURE

Applications are invited for this position from persons able to offer specialism up to final-year Honours degree level in either or both of the following areas:

Drama

17th Century Literature

The ability to assist in other areas of literature is an advantage.

Salary Scale: Lecturer I £4101-£6558.

Lecturer II £2469-£4377.

Application forms and further particulars may be obtained from the Deputy Director (Staffing), North Staffordshire Polytechnic, College Road, Stoke-on-Trent ST4 2DE. Tel: 0782 45531. Completed application forms to be returned within two weeks of the appearance of this advertisement.

ULSTER COLLEGE

THE NORTHERN IRELAND POLYTECHNIC

Head of Educational
Technology Unit

Salary Scale: £7,047-£8,844

To lead a developing central educational technology unit with a commitment to the improvement of teaching and learning processes and the effective use of all media in an educational context. Candidates must have good academic qualification, relevant experience and knowledge of educational theory and technology. The Polytechnic is a direct grant institution with an independent Board of Governors. It opened in 1971 and now has a student population of some 7,100. It has extensive new purpose-built accommodation, including 750 residential places on the 114 acre campus overlooking the sea at Jordanstown, a pleasant and quiet residential area. There is a scheme of assistance with removal.

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CITY OF LONDON

THE POLYTECHNIC

SENIOR LECTURER II IN

LECTURE II IN

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THE TIMES HIGHER EDUCATION SUPPLEMENT 14.7.78

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Applications are invited for this position from persons able to offer specialism up to final-year Honours degree level in either or both of the following areas:

Drama

17th Century Literature

Overseas continued



THE NEW SOUTH WALES
INSTITUTE OF TECHNOLOGY
SYDNEY, AUSTRALIA

Lecturer in Surveying School of Civil Engineering

The New South Wales Institute of Technology is a corporate body established to provide a wide range of professional courses for those entering or already employed in industry, government and technological fields.

A Lecturer is required by the School of Civil Engineering to specialise in Engineering Surveying.

The successful applicant will, in conjunction with other members of staff, lecture in undergraduate Engineering Surveying, supervise civil engineering and structural engineering project work and research, and be involved in course development.

Applicants should possess post-graduate qualifications in surveying or a relevant cognate discipline. Experience in engineering or construction surveying is essential. Salary is in the range of \$A14,884-\$A19,884. Fees and a contribution toward removal and initial accommodation expenses are provided for overseas appointees. A Housing Loan Scheme is also available.

Applications close on August 11, 1978. Applicants should arrange for three confidential referees to be advised by the same date. Applications should include address, telephone number, personal particulars, documentary evidence of qualifications, work and teaching experience, affiliations, publications, research work undertaken and the names and addresses of referees contacted. Applications and referees' reports are to be sent to:

The Agent-General for N.S.W.
N.S.W. Government Offices
100 The Strand
LONDON WC2N 5LZ

UNIVERSITY OF PETROLEUM AND MINERALS
DHAHRAN, SAUDI ARABIA

ELECTRONICS TECHNICIAN

The University of Petroleum and Minerals, Dhahran, Saudi Arabia, invites applications for an experienced Electronics Technician/Instrumentation Technician for the Research Workshop of the University.

(1)-ACADEMICS: High School plus 3-year trade/technical diploma or certificate in electronics, preferably specialising in instrumentation. Knowledgeable in digital electronics and solid state circuitry.

(2)-EXPERIENCE: Minimum of 5 years' industrial or research experience in the maintenance of electronic and scientific instruments, including digital multimeters and counters. Experience with tube, pressure, temperature, etc., transducers, ammeters and analog computers desirable.

(3)-TESTIMONIALS: Should possess valid certificates of qualifications and experience from appropriate certifying agency and employers.

Minimum regular contract for two years, renewable. Competitive salaries and allowances; air conditioned and furnished housing provided. Free air transportation to and from Dhahran each two-year tour. Attractive educational assistance grants for school-age dependent children. All earned income without Saudi taxes. One and a half months' vacation each year.

Apply with complete resume on academic and professional background, list of references, copies of degrees, including personal data such as family status (wife's maiden name, names of children, ages and sexes), home and office addresses, telephone numbers to:

Miss Elizabeth Whitechurch,
Cable-Tiering Services Limited,
Broughton House, 6, 7 and 8 Sackville Street,
Piccadilly, London W1X 2BR.
Telephone: 01-734 0161.

AUSTRALIA

Senior Lecturer in Sociology

The General Studies Faculty offers both a degree and diploma in social science, and sociology is a major within the degree course.

DUTIES: To work as part of a group teaching sociology. To contribute to interdisciplinary studies and to the external studies program. To provide leadership and general administrative support within the faculty.

QUALIFICATIONS: Applicants must have a sound major in sociology and substantial teaching experience at tertiary level. The applicant should provide evidence of competence in several of the following areas:

Classical theory, contemporary theory, social deviance, organisational theory, social stratification and methods in the social sciences.

APPLICATIONS CLOSE, Monday 14 August 1978. Typewritten applications stating qualifications, experience and giving sufficient information to indicate suitability for interview should be sent to the Staffing Officer, Box 428, Warrnambool, Victoria, 3280, Australia.



Warrnambool Institute of Advanced Education

OVERSEAS TEACHING POSTS

SENIOR LECTURER IN ENGLISH
(CONGO)

Department of Modern Languages, Marlon Nguabi University, Brazzaville. To teach English Language and Linguistics at undergraduate and postgraduate level and to supervise the running of the language laboratories.

Candidates should have a good honours degree in English, an MA in Applied Linguistics, English Studies or TEFL, 5 years' teaching experience and a good knowledge of French. It is desirable that they should also have a postgraduate teaching qualification and experience of working in a university in Britain.

Salary: \$5,861-\$7,707 p.a.

Benefits: Overseas and children's allowances; free furnished accommodation. 2-year LEC contract. 78 TU 89

Applications close on August 11, 1978. Applicants should arrange for three confidential referees to be advised by the same date.

Applications should include address, telephone number, personal particulars, documentary evidence of qualifications, work and teaching experience, affiliations, publications, research work undertaken and the names and addresses of referees contacted. Applications and referees' reports are to be sent to:

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ALGERIA

INELEC

(Institut National d'Electricité et d'Electronique)

requires urgently teachers of

ELECTRICAL & ELECTRONIC ENGINEERING/TECHNOLOGY

for September, 1978

(Appointments will also be made from January and September, 1979)

Experienced faculty who should have a University Degree or Higher National Diploma, are invited to teach a variety of 4-2-2 or 3-2-3 year undergraduate and technology courses at a newly created, and expanding post-secondary Institute in Algeria with responsibility for the Bachelor's degree. Responsibility for the selection and supervision of students, and the immediate supervision of teachers of courses in one or more of the following:

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- *Microprocessors
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The language of instruction is English. A knowledge of French is not essential. Salary and benefits are very attractive.

If you are interested in one of these appointments, please write with full curriculum vitae to: Miss Elizabeth Whitechurch, Cable-Tiering Services Limited, Broughton House, 6, 7 & 8 Sackville Street, Piccadilly, London W1X 2BR. Tel: 01-734 0161.

Further information will be sent to all short-listed candidates. Interviews will be held in London during the last week of July.

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School of Business & Administration

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ANALYSIS

(Ref No. 080)

Good experience in analysis, design and implementation of computer-based information systems for business or government required. In accounting, manufacturing, distribution or banking systems. Sound project management experience and computer programming knowledge essential. Teaching or training experience essential. The successful candidate will assume a leadership role within the Department for the teaching area covering all aspects of commercial systems analysis and design. Appointment will be tenured.

LECTURER/SENIOR TUTOR/TUTOR

(Ref No. 081)

Experience in commercial computer programming (especially assembly level and FORTRAN), business systems design and implementation (especially database work), or applications of operations research/statistics in a business environment. Applicants with experience in two of these areas would be an advantage. Appointment may be either tenured or non-tenured for a period up to three years.

School of Mining & Mineral Technology

Department of Geology

LECTURER

(Ref No. 082)

Applicants should have industrial experience in the application of geology to exploration mining or engineering. Preference will be given to applicants whose major interests are in metalliferous/mineral exploration geochemistry/isotope geology or remote sensing/photogeology or structural geology/tectonophysics. Appointment will be non-tenured for a period up to three years.

Department of Metallurgy

(Location at Kalgoorlie)

LECTURER/SENIOR TUTOR/TUTOR

(Ref No. 083)

Applicants required to teach iron and steel making and non-ferrous smelting in undergraduate and postgraduate metallurgical courses. Industrial experience of pyrometallurgical operations and ability to initiate and carry out research programmes an advantage. Appointment will be non-tenured for a period up to three years.

Department of Mining & Engineering

(Location at Kalgoorlie)

LECTURER/SENIOR TUTOR/TUTOR

(Ref No. 084)

Applicants required to lecture in mining technology and mine design to degree level. Relevant industrial experience in open-pit mining and/or the mining of fuel minerals and any research experience would be an advantage. Appointment will be non-tenured for a period up to three years.

School of Health Sciences

SENIOR LECTURER—NUTRITION & FOOD SCIENCE

(Ref No. 078)

To coordinate the Bachelor degree course in Nutrition and Food Science and the Graduate Diploma in Dietetics. The courses present a unique academic opportunity.

Salary Range: Senior Lecturer £12,590-£14,874. Lecturer £9,384-£12,327. Senior Tutor £8,088-£9,285. Tutor £6,868-£7,852. (Salaries quoted at June 8 rate of exchange £1.82=\$A1.00)

Qualifications: Senior Lecturer—A relevant higher degree and considerable experience, including tertiary teaching preferred. Lecturer—Post Graduate qualifications with experience, including teaching desirable. Senior Tutor/Tutor—Relevant degree and some industrial or teaching experience desirable. Candidates with particularly good experience will be considered for appointment at the above levels without a higher degree.

Conditions include: Four weeks' annual leave, fares for family plus some assistance for removal expenses are payable to appointees.

Applications: Detailed applications including a curriculum vitae and the names and addresses of three referees should be submitted not later than 11th August, 1978, to the Migration Liaison Officer, Western Australian House, 118 Strand, London WC2R 0AJ, England. A brochure containing further information may be obtained from the above address.

When applying please quote position reference number and following media code HES.

Colleges of Further Education

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SENIOR LECTURER IN FASHION

The successful applicant will be responsible for the coordination of the Fashion area within the Division of Art and Design. The College has recently been approved by the CMAA to run a B.A. degree in Art and Design commencing in September, 1978.

Fashion is a major component within this degree which is a unique generalist degree being the only one of its kind in England. A two-year TYCFE course in Fashion is also contained within the Division. Candidates should possess an appropriate qualification such as A-LEVEL, DESCCA, or BA (Fashion) or equivalent, and have suitable experience, preferably in education and/or industry.

The salary for this post will be in accordance with the Barnham Scale of Salaries for Teachers in Further Education. For details of the Barnham Scale, see the Barnham Scale of Salaries for Teachers in Further Education, Senior Lecturer Grade: £6,851-£7,765 (BA) - £7,772.

Application forms and further particulars are available from Staffing Officer, Bradford College, Great Horton Road, Bradford BD7 1AY, and completed forms should be returned not later than 28 July, 1978.



SAFFRON WALDEN

INTERNATIONAL COLLEGE

Applications are invited for the following posts, available from 1st September, 1978:

LECTURER IN Mathematics/Economics
Required to teach Mathematics at G.C.E. Advanced and Ordinary levels and to participate in the teaching of G.C.E. Advanced level Economics. Some experience of teaching overseas students would be desirable.

LECTURER in Sociology/E.F.L.
Required to teach Sociology at G.C.E. Advanced level and to contribute to a programme of tuition in Study Skills and English Language. It would be expected that the successful candidate would hold a first degree in Sociology and have post-graduate qualifications in teaching English as a foreign language.

Saffron Walden International College is a residential college for adult students from overseas operated by the BCI Educational Trust. The successful candidates will participate in teaching an integrated two-year programme of language studies and G.C.E. Advanced level studies in the Arts and Social Sciences. Salary Scale: Lecturer £6,851-£7,765. The positions are available.

For further details and application forms write to the Principal, Saffron Walden International College, South Road, Saffron Walden, Essex CB11 3DP. The closing date for applications: July 20th, 1978.

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Head of Department of School of Management and Business Studies Grade IV

to be responsible for coordination, development and administration of this progressive Department which offers a wide range of ad hoc residential management training courses for the junior to senior management, and a variety of examination and/or professional association courses. Candidates should be graduates and have an appropriate professional qualification and experience of Further and/or Higher Education. Relevant industrial experience in a position of considerable responsibility desirable.

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